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PRACTICAL SPRAYING

By C. S. Wilson

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NEARLY every experiment station has shown by careful work the value of spraying and the relative efficiency of the different spray mixtures. It is a generally accepted fact that good fruit cannot be produced without intelligent and thorough spraying. The thoughtful grower would soon convince himself of this fact by his own observation. It is exceedingly interesting, however, to view the work from a practical standpoint and see what results the fruit growers themselves are actually getting. During the last eight years a detailed study of the orchards in five counties of New York State has been made. In this study or survey considerable attention has been given to spraying and an effort has been made to find out how much greater yield the sprayed orchards have given over the unsprayed.

The table given below, which is based on the averages of all the orchards in five counties, shows very marked and interesting results. The curve marked "yield and income" expresses this table diagrammatically. These figures are worthy of careful consideration.

RELATION BETWEEN NUMBER OF SPRAYINGS AND YIELD AND INCOME

Treatment	Acres	Acre Average Bushels	Dollars
Sprayed 4 times	160	316	152.88
" 3 "	1793	288	162.55
" 2 "	4491½	276	140.39
" 1 "	2499½	232	102.91
Unsprayed.	3285¼	200.6	79.20
Total acres	12229¼		

The table is interesting because it expresses an average of so many acres, over twelve thousand in all. It shows clearly that there is a large increase in yield and income where the orchards are sprayed twice over those unsprayed. The increase in yield continues as the number of sprayings continue, though less marked after two applications. The increase in income is greater than the increase in yield though there seems to be a falling off in income in the case of the fourth application. Probably this can be explained by the small number of acres sprayed four times.

These differences are the actual results which the fruit growers themselves have been getting for the last four or five years in these counties. The figures are based on the averages of so many farms that they must be very accurate. It would seem that the value of spraying from the practical standpoint could not be questioned when, as these averages show, three sprayings give a yield of 288 bushels per acre and the unsprayed orchards average only 200 bushels, to say nothing of the more perfect fruit produced.

The table indicates that probably three sprayings have been the most economical and as these figures have included in the main the applications after the foliage appeared, we would say, according to our present understanding, that four applications including a dormant spray would be advisable for an apple orchard. Although the entomologists and plant pathologists give us the exact time of

SPRAYING IN A LARGE ORCHARD

application of these mixtures as determined by the development of these insects or diseases a good plan of spraying would be as follows:

1. Just before the leaf buds swell.

Lime and sulphur, commercial brand diluted 1–8 or 1–10, according to its concentration, or the home-made mixture.

2. Just before the blossom buds open.

Commercial lime and sulphur diluted 1–40, or Bordeaux mixture 3–3–50. Add to either mixture 2½ pounds of arsenate of lead for every fifty gallons.

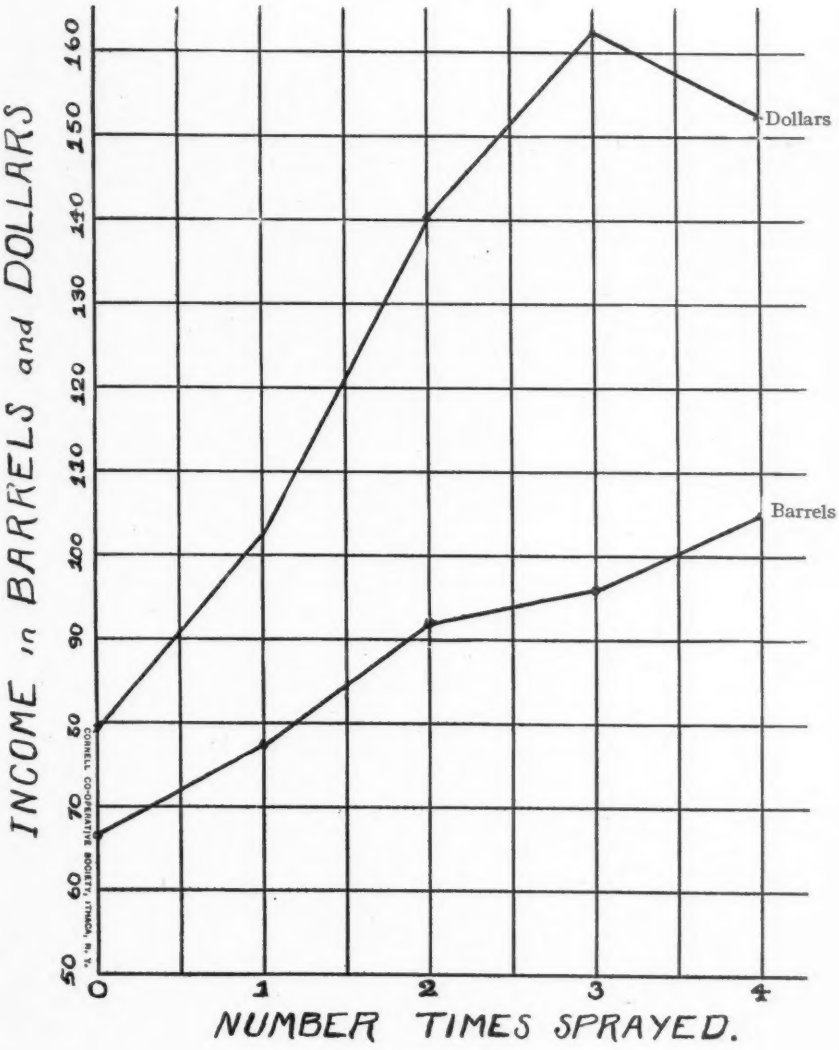
3. Just after the petals fall.

Commercial lime and sulphur diluted 1–40, or Bordeaux mixture 3–3–50. Add to either mixture 3 pounds of arsenate of lead to every fifty gallons. This is the most important spraying for the codling moth and should be applied under high pressure in such a manner as to drive the mixture into the blossom end of the fruit.

4. About three weeks after the third application.

Same mixture as number two.

ACRE AVERAGES FOR 12,229 ACRES IN WESTERN NEW YORK



CLEANING THE WEEDS FROM A THOUSAND ACRE FARM

By H. E. Horton, Agronomist

WHY kill weeds? There is no reason for killing weeds when you farm for a living only, but when you farm as a business you must have clean fields if the balance is to be on the right side of the ledger. A clean field has a meaning beyond the few bushels more grain harvested; a clean field means a cultured mind and stands for something in the man which in turn means prosperity of the broadest kind.

No general effective scheme for killing noxious farm weeds exists. The talk of crop rotation, the stock answer of the colleges to anxious enquirers, has failed in the past and must fail in the future and this for the reason of accommodation to environment. Wild mustard and wild radish were the peculiar pests of the "Three Field System," and they are the great pests of the most modern "Sugarbeet Factory System" with its intensive cultivation.

For a number of years the author has worked on the problem of weed eradication, and at present is engaged on an experiment of great magnitude, the cleaning of a thousand acre farm.

The farm chosen for the work is located in the fertile Red River Valley district a few miles west of Winnipeg. In the system of agriculture practiced, large areas are devoted year after year to growing cereals.

From time to time in the past years weeds have appeared on the farm, and from small beginnings they are now disputing with the grains the possession of the fields. They have reduced yields, injured quality of sample, increased the cost of grain growing, and have detracted from the physical appearance of an otherwise beautiful farm.

The owner, realizing the serious conditions, sought for some form of relief, and I was fortunate in securing the opportunity to study his problem and plan and carry on a systematic campaign of weed eradication.

A careful survey of the property showed wild mustard present in large quantities; Canada thistle a close second in numbers; Frenchweed (Thlaspi arvense L.), sow thistle (Sonchus arvensis L.) and Kinghead (Ambrosia trifida L.) present in quantities and in the order named. Every field had been invaded; every fence, ditch and roadside had become a nursery for weed seedlings. Half acre spots in the fields where grain had been threshed from the stook were pest spots.

Every means known for weed eradication has been studied and when one has promised well it has been tried out on a large scale. Many methods have proven ineffective; others to be described are effective; and still others of a cultural nature are to be studied in the near future. The literature on the subject of weed eradication is becoming voluminous, and as usual the greater part comes from Germany, the home of real agriculture.

The problem was to clean the fields quickly, while growing crops if possible, and accomplish this with as little expense as possible. The following plan was adopted for the work:

Clean the open ditches to prevent overflows in the Spring; mow the road allowances; remove the rock piles; burn heaps of roots picked from the fields, burn the remains of straw stacks; remove the piles of rubbish about the farm-yard; mow under and alongside of the fences and secure a permanent sod; add no weed seed to that already in the ground; clean the seed sown on the fields; general spraying for the destruction of annuals like wild mustard and Frenchweed; spot spraying with a kill-all-chemical for

A SPRAYING MACHINE FOR A THOUSAND ACRES OF GRAIN

FILLING A FIELD SPRAYER FROM A TANK WAGON

destroying perennials; hand pulling of annual not controlled by spraying; threshing from stack instead of from stook; tillage of stubble fields and Summer Fallow.

It will be seen at a glance that this plan divides itself into CLEANING UP and TILLAGE (Spraying has been looked upon as a tillage operation in Germany.)

Two ways of cleaning were chosen, spraying with a kill-all-chemical which destroyed all weeds down to the ground, and in many instances Canada thistle and sow thistles six to eight inches under the ground, and mowing with short scythe. The material cut was either fed to hogs or dried and then burned.

The open roadside ditches grew every weed to be found in the infested fields. By them the much dreaded Kinghead had been distributed over the low spots on the farm.

The road allowance–everywhere the breeding place for weeds–was cleaned by mowing with machine using the brush bar. In this way Canada thistle, sow thistle, kinghead, were prevented from seeding. The low brush found on the road, the prolific cause of drifted roads in winter and the catch-all for weed seed all the year through, was cut down and grubbed out.

In past years the rocks and the roots of the willow which formerly covered the prairie had been carried to the edge of the field and piled, and to make these secure places for weeds to grow odds and ends of barb wire had been added to the piles. At considerable cost and discomfort these piles were removed. The roots were used to heat the boilers in the piggery.

The remains of straw stacks had been burned in the fields. Ashes, charred straw, a tangled nonburnable mass spotted the farm. These spots remained uncultivated and soon became the nursery for all the farm weeds, especially Canada thistle. Immense quantities of wild mustard seed sprouted from time to time but very few plants reached maturity. These spots were removed by burning, a very slow process, but persisted in until the ground was finally laid bare.

Piles of old machinery, scrap iron, broken posts, rotting lumber, rotting straw were scattered about the farmyard. Each pile had all the weeds growing luxuriantly. The junk man was called in to care for the iron and what material could not be used and what would burn was burned.

The farm clean and the plan to keep it so determined upon, the tillage, planting, and harvesting methods were studied and when necessary changed with the one idea of killing weeds.

In the past, manure containing viable seed had been added to the soil. The use of manure direct from the barn to the land is a menace, and this is especially true when mill stuffs are fed. On this farm the manure from 150 head of cattle will be rotted before going onto the land, and as far as possible, will reach the grain only through the hoed crops. In the great Northwest up to the present time, the growing of hoed crops like potatoes, maize, mangel wurzel has had no place.

A very interesting study for a rainy afternoon on the farm when work is slack, is the subject of homely farm proverbs having to do with crop growing. Many and many pithy sayings known to our ancestors contained the quintessence of farm wisdom. One of the most common sayings has to do with weeds, "One year's seeding is nine years weeding." No farm can be cleaned and kept clean if this is forgotten or neglected. The noxious weeds are constantly entering the farm through dirty seed and this farm had been no exception. Now seed is secured only from reputable dealers, carefully cleaned with a good fanning mill, and all floating seed removed when the grain is bluestoned.

The destruction of wild mustard in crops of growing grain by spraying with inexpensive chemicals has been firmly established wherever agriculture is carried on as a science. In 1908, it was shown by the author that Frenchweed was destroyed by spraying with sulphate of iron solutions under certain favorable conditions of humidity.

All the grains on the farm, in all over 600 acres, were sprayed with this material to destroy the two annuals mentioned, and in every instance the work was successful.

Experiment was made on another farm, spraying maize with a 20% solution sulphate of iron to destroy mustard plants so close to the stalks that they could not be reached with the teeth of the cultivator. This experiment was successful and no permanent injury to the corn resulted. In the coming year the maize fields will be sprayed to destroy mustard.

The hardest problem has been and still is the destruction of the two perennials Canada thistle and sow thistle. Tillage methods in the semi-arid Northwest have so far failed. It is well known that the Canada thistle thrives when the land is summer fallowed, and the same is true of the sow thistle.

This year early grain was used on the worst fields, but this cannot be persisted in for the time would soon come when the whole farm would be given over to growing these crops. The greatest hope lies in the direction of spraying with chemical solutions.

Under certain conditions at present, not understood, Canada thistle is killed by spraying with sulphate of iron, but this means cannot be relied upon at this time. Solutions of all the inexpensive heavy chemicals were used as sprays in 1910, but in no instance met with the least success. At last one chemical was found, which, applied in the form of a spray, quickly destroys all parts of the weed above ground and in instances has destroyed the vertical root down to and including its juncture with the horizontal root. Extended experiments will be made with this material in 1911 and it is to be hoped that they meet with success.

What has been said of the Canada thistle is true of the sow thistle.

Cutting Canadian thistle and sow thistle down close to the ground was without effect, the plants simply redoubled their efforts to produce seed and store up reserve stuff in the fleshy roots. Where a single plant carried one flower stock previous to cutting it carried a half dozen after cutting. Curiously the plants accommodated themselves to being mowed by not sending up long stems bearing buds but in their place stems so short that the second attempt at cutting proves ineffectual.

HANDLING LARGE QUANTITIES OF SPRAYING SOLUTION IN THE FIELD

One of the already great and still growing weed pests of the Northwest is Kinghead. When this weed occurs in grain crops spraying with chemical solutions is useless labor.

This weed is waterborne in habit and when the snow melts in the Spring the water held back by the stopped ditches overflows and runs across country and accumulates in all the low spots in the fields overflowed. The kinghead seed is carried and left in the low moist spots and with the coming of warm days grows and soon overtops the grain. To control the spots of kinghead gangs of men hand pulled the fields and this will be continued in 1911.

When the grain was harvested, the fields were given a light stroke with the spring tooth harrow to prepare a seedbed for the rapid germination and growth of the seed of the annuals lying near the surface of the soil. Mustard and Frenchweed soon made the fields green, but the plants were cut down by the first frost. This procedure, followed by rolling when the weather is not favorable to seed germination, offers a sure means of destroying large quantities of mustard and Frenchweed seed. Late cultivation to germinate seed to be killed by the first frost, and early cultivation with subsequent tillage to kill the seedlings, cannot be too highly recommended as a means for killing annual weeds. On the Manitoba farm the short periods before and after harvest reduces the value of this procedure but with threshing from the stack the fall cleaning is sure.

In past years the grain had been threshed from stock in the field. The powerful blast of the separator scattered the wind borne seed of the Canada thistle and sow thistle high in the air to be carried by the ever blowing wind to the farthest limits of the farm. Heavy seed like wild mustard supposed to be caught and prevented from falling to the ground invariably fell to the ground and grew the following year.

When the threshing machine had been moved from one part of a field to another part it left a trail of weed seed. Threshing out of stack in the farm yard prevented this seeding.

In past winters a hundred wagon tracks had been made carrying the straw from the stack in the field to the barns, and each track was richly seeded with weed seed.

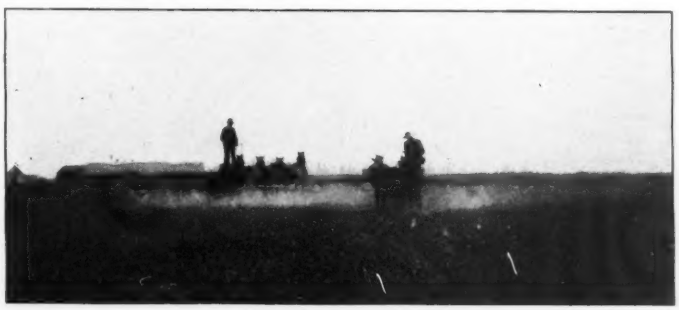
All the grain grown on the farm in 1910 was stacked in the farm yard and threshed from there. The fields surrounding this yard will grow hoed crops the coming year and any windborne seed taking root in them this year will be destroyed the coming year.

There are great advantages in threshing from the stack: Stacked grain can be insured; stacking always gives a better "sample;" the grain off the fields, the Fall tillage can begin and continue until the ground freezes.

The work as outlined above will be carried on until the farm is clean; meantime efforts will be made to clean the district and thus insure against reseeding.

The eyesore on almost every farm is the fencing. Usually tumbled down, always unkempt from the grass of several summers piled against the bottom wire. Weeds and seed traveling across the farm propelled by the wind finally reach the fence and find a place especially prepared for them. All the noxious weeds were found along the fences on this farm. The mass of green and dry organic matter was cut with a brush scythe and pulled out with the rake and opportunity given the grasses to form a sod under and along both sides of the fence. Maintaining driveways next the fences though frowned upon by penny wise farmers, has proven a sure means for keeping the fences clean.

This ended the cleaning up, and it was wonderful how much better the farm looked. The farm untidy in spots is like the man with a good suit of clothes and wearing shabby shoes. No matter how many and fine the buildings, the beautiful stretches of pasture dotted with fine stock, all is lost sight of in the presence of unkempt spots.



THE TESTING OF WHIRLING-SPRAY NOZZLES

By H. W. Riley

Assistant Professor of Farm Mechanics, Cornell University

LOOKED at in a certain light the spray nozzle is the most important part of a spraying outfit because upon it rests the responsibility of properly depositing the spray mixture upon the tree or plant; be the pump ever so good, the engine ever so powerful or the agitator ever so efficient all is for naught without a good nozzle.

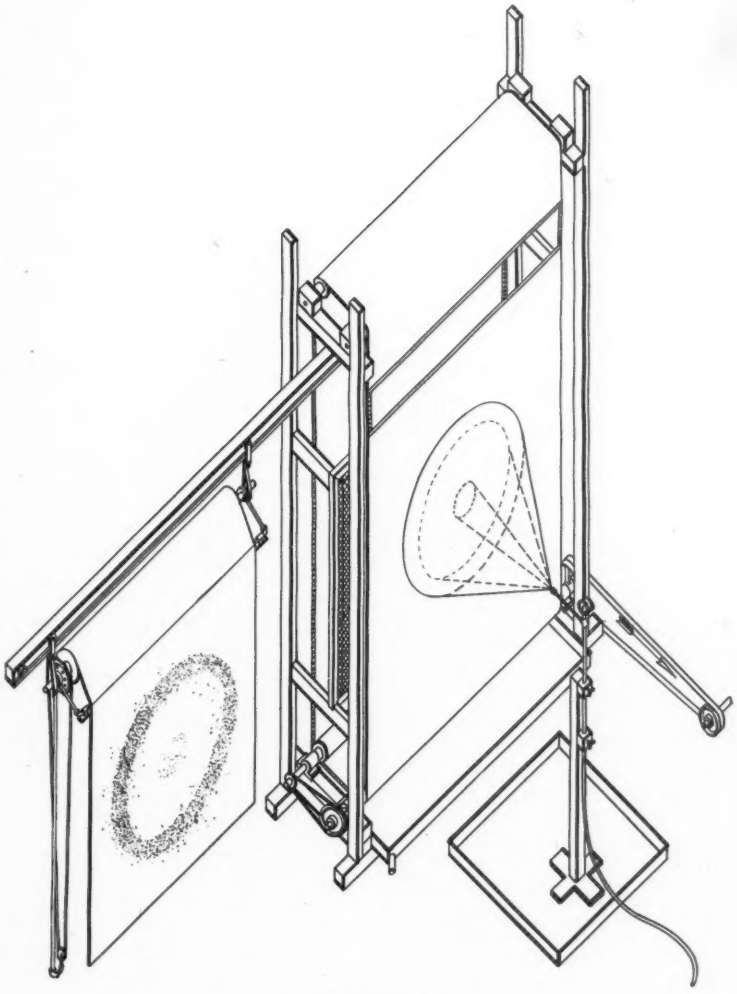
According to the results to be attained the design of the nozzle is changed. Thus, when our aim is to force poison deep into the blossom cups of apples we need nozzles with heavy driving delivery while for combating fungus diseases and for practically all other spraying we need nozzles that will deliver a fine spray with more or less driving power depending upon the crop. To answer these needs the whirling-spray nozzle is almost universally used so that the invention of this device becomes an event of considerable importance and it should be a cause of pride to Cornell University that this invention was perfected here in 1879 or 1880 by the then substitute professor of Entomology, Wm. S. Barnard, the experiments being carried on in McGraw Hall.

As its name implies this nozzle secures the breaking up of the liquid by imparting to it inside the nozzle a rapidly whirling motion and then allowing it to discharge into the air thru an opening placed at the center

about which the liquid whirls. The chamber in which the whirling is secured is called the eddy chamber and the openings leading diagonally into it may be called the throat openings. The spray from nozzles of this type is in the general form of a hollow cone with more or less straight spray in the center. The sharpness of the cone, the fineness of the spray, its driving power, the amount of straight spray in the center and the amount discharged per minute depend upon a number of factors the relative importance of each of which has not yet been determined but among them may be mentioned the pressure used, the size of discharge orifice, the thickness of the edge of the discharge orifice, the actual size and also the proportions of the eddy chamber, the shape of the top and of the bottom of the eddy chamber, the angle of entry of the throat into the eddy chamber and the number of throat openings used.

The Department of Farm Mechanics at first attempted to determine the laws underlying the design of whirling spray nozzles by testing a number of commercial nozzles in connection with a sort of spray camera or "Sprayograph," an isometric drawing of which is reproduced herewith. While interesting individual results were obtained from these tests nothing fundamental could be determined because in changing from one commercial nozzle to another more than one factor was changed and while the two nozzles would behave differently in certain respects it was impossible to determine exactly the cause of these changes. The testing of commercial nozzles was, therefore, temporarily discontinued until there could be obtained an experimental nozzle by means of which one factor at a time could be changed. Such a nozzle is now under construction.

A brief explanation of the "Sprayograph" may be in order. The aim is to allow colored liquid sprayed from the nozzle to strike against white paper for a period of time the length of which must be under control. During the exposure both the nozzle and the paper must be stationary and a record of all parts of the spray must be taken. In the plan employed an oiled canvas curtain is stretched over four rollers and is driven over the rollers by a chain at each edge which runs on gears mounted on the ends of the rollers. Only two of these gears are drivers and the speed of these drivers may be changed by the chain drive between the two bottom shafts. Power to run the curtain is obtained from a gas engine at the right. The ends of the curtain do not meet but leave a slot of any desired width as shown. Paper in rolls about six feet long is hung from a carrier on a track running inside the curtain and this paper is backed by a wire screen to prevent its blowing. To take a record the paper is spread over the wire screen behind the curtain, then by means of the engine the curtain is turned until the slot is on the side away from the nozzle when the spray liquid is turned on and drives against the blank surface of the curtain. When all is ready the power is turned on to the rollers again, the slot in the curtain moves down across the face of the paper permitting the spray liquid to strike the paper for an instant only the length of which is determined by the width of the slot and the speed of the curtain. Power is turned off, the curtain stops, the paper carrier is pulled out on the track and the record sheet may be torn off on the knife attached below the carrier. In this way, a Sprayograph record is completed.



SPRAYOGRAPH

DWARF APPLES

By U. P. Hedrick

Horticulturist at the New York Agricultural Experiment Station, Geneva, N.Y.

WE are now in the midst of the periodic revivals of dwarf apples. Several prominent fruit growers recommend the growing of apples on dwarf stock; a book has been written on the subject; a number of experiment stations are trying the dwarfing method, and the horticultural press is telling "Why You Should Grow Dwarf Apples." Especial interest in dwarf apples began at the New York Agricultural Experiment Station in 1901, when the *State Fruit Growers' Association, The Eastern New York Horticultural Society,* and *The Western New York Horticultural Society* appointed committees to confer with the authorities at the Station for the purpose of locating experimental orchards of dwarf apples.

Three sites were chosen for experiments: One at Kinderhook, in the Hudson Valley, on the farm of Edward Van Alstyne; another at Fayetteville, Onondaga County, on the farm of F. E. Dawley, and the third at Carlton, Orleans County, on the farm of Albert Wood & Son. The trees in these orchards were budded on three stocks, and this leads to a consideration of the whole matter of stocks. Several kinds of dwarf apples are used as stocks upon which to bud or graft free-growing apples to dwarf them. These have been used in Europe probably for several centuries, and from this experience two kinds have been selected as having preeminent merit as dwarfing stocks; one the Paradise—the other the Doucin.

Of the two stocks, the Paradise makes the smaller tree, and is sometimes called the "Dwarf Apple" the Doucin, the "Half Dwarf Apple." The effect of grafting the common varieties on Paradise stock is a very diminutive or bush-like apple tree. These stocks are grown in Europe, mostly in France, and very largely by means of mound layers, a fact which indicates that the plant is inclined to stool or sucker, often forming, when left to mature, a true bush. This stock is also extremely shallow-rooted, and needs much fertility in the soil, and still more an abundance of moisture. Not all varieties of apples thrive on Paradise roots, scions of many failing to make perfect unions. The Northern Spy, Ben Davis, Baldwin and R. I. Greening seem to be examples. The union is very poor with nearly all varieties unless the tree is trained to some style of dwarf head.

The Doucin stock produces a tree about mid-way between the Paradise dwarf and the common standard tree. Nearly all varieties of apples are thought to produce a good union with this stock, though we are not finding this quite true in our experiments. Its food and moisture requirements seem to differ but little from those of the standard trees, though without doubt they should receive much more attention in training. With both of these dwarfing stocks it is necessary to make sure that the scion does not throw out roots and give what is called a "bull" tree. Unfortunately, the scion may root at any time from setting to maturity. Doucin stocks are also brought from Europe and if from England care must be exercised as to the name of the stock ordered; for the English call the Doucin stock "Broad leaved Paradise," and the true Paradise "French Paradise." This confusion in names has caused much trouble in ordering, and without doubt there are many plantations in America on stocks wrongly named.

Since practically all of our apples are now on standard stock all are familiar with it and little need be said of it here. The trees upon which apples are grafted or budded for standard trees come from France for the most part, and are called "French Crabs," the word crab being used in

the sense of a wild or inferior tree, not necessarily the true crab apple. These stocks are grown from seeds and are imported to America in great numbers. Some standard stocks are grown in America and are known to the trade as "domestic stocks." All varieties of apples make good unions with standard stocks.

In Europe, dwarf apples have a number of advantages over the standard trees. Advocates of the smaller trees claim the same advantages for the dwarfs in America. It is very doubtful if these hold on the two continents to the same degree, yet they may be set forth here.

1. Dwarf trees, especially those on Paradise stock, come in bearing earlier than standards.
2. All orchard operations are more easily performed.
3. Winds cause less injury to the trees and crops.
4. The small size of dwarf trees permits the planting of a greater number of varieties on a given area.
5. The fruit from dwarf trees is of higher quality as to size, color and flavor.

We are now ready to see how the experiments by the Geneva Station so far justify these claims.

The Van Alstyne orchard contains 306 trees distributed among the three stocks as follows: Standard trees, 27; on Doucin stock, 153 trees; on Paradise, 126. These were distributed among the following varieties: Baldwin, Boiken, Holland, Hubbardston, Jonathan, Lady, McIntosh, R. I. Greening, Rome, Sutton, Wealthy and Wagener.

The Dawley orchard is planted with 512 trees, the number on each stock being: Standards, 42; Doucin, 161; Paradise, 309. The following are the varieties: Alexander, Baldwin, Boiken, Esopus, Gravenstein, Green Sweet, Grimes, Hubbardston, Jacob Sweet, Jonathan, Longfield, McIntosh, Monmouth, Northern Spy, Pumpkin Sweet, R. I. Greening, Rome, Sutton, Wagener, Wealthy, Wolf River and Yellow Transparent.

In the Wood orchard there are 300 trees: Forty-five on standard, 90 on Doucin and 165 on Paradise stocks, distributed among the following varieties: Alexander, Baldwin, Ben Davis, Boiken, Gravenstein, Jonathan, Holland Winter, McIntosh, Monmouth, R. I. Greening, Rome, Sutton, Lady, Bismark, Twenty Ounce and Wealthy.

Taking up the several claims for dwarf trees, we have to discuss first early bearing. The following are the combined yields for the several years in the three orchards:

The first year after planting—trees three years from the bud—one apple was borne by a Boiken on a Paradise stock. The second year after planting, the 602 Paradise trees in the three orchards bore 237 apples, Boiken, Ben Davis, Wealthy and Wagener producing the crop. The 444 Doucin trees bore twenty-one apples, distributed among nearly as many varieties. The 114 standard trees bore no apples this second year. These figures give an average of less than half an apple to the tree for the Paradise stock, hardly justifying the oft-made assertion that trees on this stock bear paying crops the second year from planting. The third year the Paradise trees bore in the three orchards an average of 1.6 apples per tree. The Doucin stock an average of a little over a half apple per tree. The 114 standard trees this year bore two apples. In 1908, the fourth year from setting, the Paradise trees bore an average of 5.7 apples per tree; the Doucins 1.8 apples; the Standards this year bore nearly a third of an apple per tree. The fifth year from setting the 602 Paradise trees bore 12.7 apples per tree; the 444 Doucins bore a fraction less than six apples per tree and the 114 Standards produced a half apple per tree.

If varieties are compared there is a tremendous variation. Boiken, Ben Davis, Wealthy, Wagener, Longfield, Rhode Island Greening, and Rome, about in the order named, have been the largest bearers, while Sutton, Northern Spy, and Twenty Ounce did not yet start to bear on any of the stocks until the sixth year.

These figures show that while apples on Paradise stock come in bearing earliest, they do not bear profitable crops, as is so often stated, two years from planting, and only in one of the three orchards could there have been any financial return from the varieties on Paradise until the fifth year.

As to the claim that orchard operations are easier in dwarf orchards it is apparent at once that such is the case for nearly all operations, yet there are exceptions that in these days of first-class orchard equipment nearly offset the greater ease with which dwarf trees may be sprayed and the fruit thinned and pruned. I refer to cultivation and pruning. The close planting and low heading in dwarf orchards make it difficult to cultivate properly and to some extent to get about at all in the orchard. In pruning the work with dwarf trees is vastly greater. Not only must there be the usual winter pruning, but also a much more painstaking and laborious summer pruning coming at a time when help can be illy spared. Moreover, each season it is necessary to dig about the trees to see that the scions are not taking root. In these experiments it has been found much more difficult to train the dwarf trees with good heads than to similarly shape standard trees.

Coming to the third claim for dwarf trees, that wind does less damage to trees and crops,—this experiment demonstrates nothing. From observation it is certain, however, that the loss from gales in a windy country and high-headed trees is greater. The difference between dwarf and low headed standard trees, however, in this respect is almost a negligible factor. If standard and Paradise trees are compared the difference is in favor of low-headed standards for in the orchards under consideration it was found that the shallow-rooted Paradise trees often blew over.

The fourth claim of merit is as to the small size whereby more dwarf trees can be planted on a given area. This is an advantage for amateurs who have little room and want many varieties, and to the fruit grower who may want to test varieties. These three orchards demonstrate very plainly, however, that the enthusiasts who are recommending for America a distance of anywhere from six to twelve feet for Paradise stock and eight to sixteen for Doucin, are putting them far too close together. In America these distances will have to be doubled unless the soil, trees and methods are very different from those in these experiments or in the many orchards that have come under the writer's observation.

The claim in regard to greater size, higher color and better flavor for the fruit of dwarf trees, is one most often made, and yet in these three orchards we have been badly disappointed in these regards. Where comparisons have been possible the fruit from dwarf trees has been no better in size and flavor than that from standard trees, or that to be found in many orchards of the same size and varieties in different parts of the State. Whether this will continue indefinitely remains to be seen, but certainly up to the present there has been little to justify the claim for better quality from dwarf trees.

The work in these orchards brings out several marked disadvantages of dwarf trees. The first is that the trees are more expensive than standard trees. It costs more to propagate and grow them and the nurserymen must get more for them. A second is that there is now and has been for generations a dispute as to what the true Paradise and the true Doucin stocks are. When to this confusion is added the disposition of some nurserymen to substitute, those who have had experience in buying trees know well what the possibilities are of getting the right variety on the right stock. Third, as we have pointed out in one or two particulars, dwarf trees need more care. This applies to all particulars. The loss of dwarf trees by death, from one cause or another in these three orchards is much greater than in orchards of all standards.

Fourth, while this test of dwarf trees does not prove it, all concede that such trees are much shorter lived than standard trees. How much shorter cannot be said without more definite data than can now be found.

In conclusion, while this experiment is not nearly finished, it is apparent to all who have been working with the orchards that dwarf apples will not take the place of standard apples in commercial orchards. Whether they can be profitably used as fillers with standard trees is a question. The writer would prefer standard trees as fillers. It may be that some varieties can be profitably used as dwarf fillers. Possibly a few sorts may be used in limited numbers for a commercial orchard of dwarfs. The only place for dwarf trees at present seems to be, under some conditions, in the garden of the amateur.

RECENT ADVANCES IN OUR KNOWLEDGE OF LIME-SULPHUR

By J. P. Stewart
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IN a rapidly progressing subject such as lime-sulphur, it is well to get our bearings occasionally by looking back over the road we have traveled. The career of lime-sulphur as a spray material has been rather checkered. Starting in 1886 at Fresno, Cal., when a Mr. Dusey borrowed a pail full of sheep dip from his neighbor, under the impression that if it killed the lice on sheep it ought also to do it on trees, it speedily became the leading contact insecticide thruout the Pacific Coast. It was then brought East in 1894, soon after the discovery of scale in Virginia, was tried in Maryland and discarded, being found apparently useless under eastern conditions. It was partially revived by Marlatt in 1900, but failed to secure wide acceptance until after the work of Forbes and others in 1902. From the latter date until approximately 1909, it remained the standard insecticide thruout the country, in spite of its many objectionable and disagreeable features. This was the old, home-boiled, dilute mixture which finally came to be made by using 15 or 20 pounds of lime and 15 pounds of sulphur to 50 gallons of total product.

While this development was taking place in the dilute mixture, another preparation, without the objectionable features, was gradually coming to the front. This was the so-called commercial or factory-boiled lime-sulphur. It was storable, free from sediment, easily applied, and though much denser than the home-made preparation, it was practically free from crystals. Just when and by whom it was first used as an insecticide, I have been unable to discover. It appears, however, that along in 1902, or 1903, a Stock Food Company of Omaha, learned that some of their patrons in Utah were buying a few extra barrels of a concentrated cattle-dip for application to trees. Later inquiries and tests showed the value of this, and from that beginning has developed the present remarkable production of commercial lime-sulphur materials. Both types of lime-sulphur insecticides, therefore, came into use rather accidentally and apparently independently, as the result of a transfer in use from dip preparations.

Along in 1908, when the writer became interested in the situation, the making of these dense, non-crystallizing insecticides was supposed to be accomplished by some difficult, factory process, wholly beyond the capabilities of the orchardist, and consequently worth about three times as much to him as we now know they can be readily made for at home.

At this time it was learned that

Cordley in Oregon had made a "stock solution" lime-sulphur. Details of his work were meager, however, and not generally available. There also appeared to be some doubt as to the correct ratio of lime to sulphur, and the proper concentration to be used. For example, in the version of his formula given by Parrott, (New York Geneva Bul. 319) a 60-to-125 ratio was advised, while in his own later account, (Better Fruit, April 1909) 60-to-110 was used; the latter ratio having appeared in 1906 in a formula used by Thatcher, at one-half the present weights. (Washington Bul. 76). As to concentration used, it appears that with the larger amounts of ingredients (60 lbs. of lime to 125 lbs. of sulphur), only enough water was added at first to make 45 gallons of mixture, while in the other case the total was brought up to 60 gallons. No further additions of water were indicated in either account to make up for the losses in boiling, which was to be for one hour or more. After boiling and settling, only the clear liquid obtainable above the sediment was drawn off; and in the former case this amount of liquid was diluted to make the final 50 gallons of *concentrate*. This was again diluted for use, at the rate of 1 to 10 (total), and the sediment was to be re-used in succeeding boilings.

The faults and uncertainties of this method are very evident now; and it was doubtless fortunate for the home-made concentrate that no wide attempt was made to strictly carry it out in orchard practice. It is of interest, however, as marking the advance made up to the early part of 1909.

The next move was made at the Pennsylvania Station. The work had begun before the above accounts appeared, though most of their facts were known. The general attitude and propects for success at that time may be gathered from a remark by one of our leading insecticidal chemists, then at the Station, whom the writer was trying to enlist in the cause. His advice was to go ahead with the work but not to be disappointed in case nothing was learned, because the whole subject had been studied thoroly already by chemists, and nothing new was to be expected.

The results of the subsequent work have appeared in various places, and we can here merely mention some of the leading facts established.[1] We found that the crystals occurring in the old, dilute preparation were due to excess of lime. The value of this excess was questioned and later proved to be unnecessary against scale, as was already known in the case of fungi. The cause of the crust which develops over concentrates was shown to be due to exposure to air, and its prevention was readily accomplished.

The proper ratio of lime to sulphur was studied, and the ratio of these materials *in solution* was found not to be constant as Thatcher supposed (Wash. Bul. 76) but to vary primarily with increase in density. Thus in dilute solutions the ratio occasionally ran as low as 1 to 1.8, while in dense concentrates it averaged about 1 to 2.5, with individual cases much higher. Owing to losses in making and impurities in the best of our commercial limes, however, we found definitely that for orchard conditions the *best ratio of ingredients* is approximately 1 lb. of high calcium lime to 2 lbs. of sulphur.

In connection with the matter of concentration, the relation existing between volume, density and utilization of materials was determined. The greater densities, obtainable with lower volumes of concentrate, were shown to be associated with less economical use of materials, and hence to be undesirable. Where storage conditions are to be met, however, a final volume of 1 to 1.1 gallons of total product is about right for the weights of ingredients named above. Other-

[1]For details and data see Penn. Sta. Rpts. for 1908-9 and 1909-10; Bulletins 92, 99 and 106; Rpt. of Soc. for Hort. Sci., 1909; and *Rural New-Yorker* 1910, pp. 944 and 1096. Bull. 99, obtainable from the Director of the Experiment Station, State College, Pa., gives details of preparation.

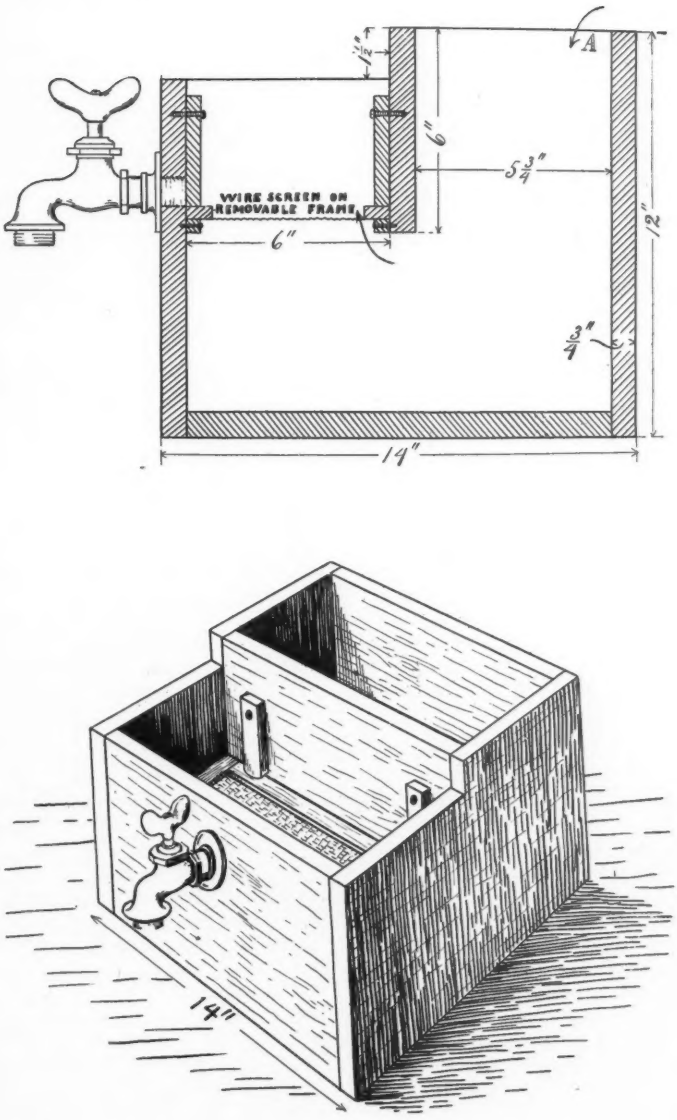

Figure 1. (Original). A new type of strainer for lime-sulphur or other spray materials. The liquid enters at "A" passes upward thru the screen and is carried where desired thru a hose attached to the spigot. The coarse particles thus fall away from the screen instead of accumulating on it. Any solution remaining with the sediment may be secured by running through it the water used in the next boiling.

wise somewhat greater volumes may be used, diluting according to density in all cases.

The sediment in properly made concentrates was found to *actually* occupy less than 10% of the total volume, tho by settling alone it *apparently* occupied 30 to 50%. Most of it is unobjectionable in the home preparation, but for more readily removing its coarser portions, we have recently made a new type of strainer, the construction of which is shown in the accompanying figure. The usual clogging is avoided in it by straining upward, the coarse particles falling away from the screen instead of accumulating on it as in other strainers.

The amount of sediment was found to be influenced by the manipulation, by the ratio and purity of the materials, and by the amount of boiling. The best index for completed boiling is the evident dissolving of the sulphur granules.

Ordinary winter temperatures were found not to exert any permanent effect on the concentrates, the only danger in freezing apparently being the possible breakage of containers, and the freezing points lowered with increase in density. Acids and carbon dioxid, however, readily break down the solution.

In connection with the *use of lime-sulphur*, the first definite system of dilution according to density was developed, foliage tests were made, some of the conditions influencing spray injury were determined, and the thoro control of scale on apple by summer applications alone was demonstrated, (*Rural New Yorker*, 1910 p. 944). The amount of spray injury was found not to depend exactly upon density of application, but rather upon the density attained on the leaf before evaporation is complete. This was affected by the abundance of application, the density of the material applied, and the size and location of the drops retained by the leaves, the younger leaves and under surfaces being most vulnerable. (Penn. Rpt. *1908–09:*286–89; and Bul. *99*:15). Injury is also especially liable to occur after applications of bordeaux or after previous applications of lime-sulphur which have broken the epidermis. This accounts for some of the anomalous cases of severe injury that have come to our attention during the last two seasons. (*Rural New Yorker 1910:* 1096; and Penn. Bul. *106:* 11–13).

The recent work at various other stations cannot be adequately treated in the present space. The general outburst of activity along all lines of sulphur sprays has been quite remarkable. The excellent work of Scott at Washington in showing the usefulness of the self-boiled preparation, especially in the control of peach diseases, and also of Quaintance in showing its value in the summer control of scale on peach are worthy of special note. Wallace's extensive work at Cornell against apple diseases, his demonstration of the special value of the lime-sulphur-lead-arsenate combination, and his emphasis of the relation between broken epidermises, by scab or insects, and lime-sulphur injury are also noteworthy. This injury is thus brought in line with that of bordeaux, as pointed out by Crandall in Illinois, and with that of arsenicals, as pointed out by Gillette in Iowa (Iowa Bul. 10, 1890). Parrott at Geneva has demonstrated the value of sulphur sprays against blister mite, and has shown the worthlessness of the sediment against scale. Van Slyke and Bosworth at the same place have emphasized the general undesirability of magnesium in lime used in the ingredients; and Waite at Washington has called attention to possible values of copper and iron sulphids. Besides these workers, Taylor in Missouri, Fulmer and Cæsar in Ontario, Bonns in Maine, Volck and Ballard in California, and many others are doing their share in the present movement of advancing, verifying and perfecting our knowledge of the making and use of sulphur sprays, and still there is work to be done.

SPRAYING FOR WEEDS

By R. D. Anthony
Instructor in Pomology, Cornell University

THE weeds that injure our field crops and the fungi that injure our fruit crops are both plants, in fact, we could say that the fungi are weeds growing on other plants instead of on the ground. For years we have been used to spraying the plants we call fungi to destroy them and now we are finding that it is just as possible to destroy certain of the plants which we call weeds by spraying. Wild mustard (*Sinapsis arvenis* L.) is one of the weeds which is most certainly destroyed by proper spraying, using either sulphate of copper or sulphate of iron. This weed is especially troublesome in spring grains where cultivation is not possible so the discovery of another way to control was an important step toward better crops.

On many farms in this state the raising of oats, buckwheat, and rye has been discontinued because of wild mustard while on others the yield has been materially decreased. It was for this reason that field spraying experiments were started last summer in cooperation with Prof. Warren of the Agricultural College. Five localities were selected, covering a belt extending nearly across the state and embracing a variety of conditions.

WILD MUSTARD IN OATS

The first spraying was done on the farms of Jared Smith and Gilbert Townsend near Trumansburg, when the oats and mustard were from three to eight inches high. A Binks traction machine especially designed for field spraying was used. It covered a strip of about sixteen feet and, after we learned the necessity of keeping the

"THE FIELD WAS STRIPED LIKE A ZEBRA"—FROM IRREGULAR DRIVING

pressure high enough to give a fine drifting mist spray, we could wipe the mustard out of ten acres of grain in an afternoon easily unless the weather man decreed otherwise. If rain fell within eighteen hours the efficiency of the work was greatly reduced and several times it was necessary to repeat the spraying because of this.

We next attacked the oat fields in the fertile Genesee valley on the Wadsworth estate near Avon. Here we used a potato sprayer by adding extra nozzles to fill the spaces left uncovered by the potato boom. Rain dogged our footsteps till we were forced to abandon one field but plots were successfully sprayed in two others. It was in photographing these fields that we learned a few facts by dear experience. Our spraying results were so satisfactory that we were especially anxious to get good pictures but our plates and those of a professional were total failures because, except under special conditions, yellow and green show as the same color on a photographic plate. It was not till a week later that we discovered by chance that when a piece of colored glass, called a "ray filter," is slipped over the lens the blossoming mustard will show up as if by magic on the plate.

Near Batavia there was a farm where two years before the oat crop had been nearly a total failure because of mustard. The present owner, Mr. George Legg, was determined to clean the farm and when he learned what we were after he gave us a warm welcome. The only machine available was an old "Standard" potato sprayer. We used it with many misgivings and were agreeably surprised to find that it did satisfactory work. We sprayed oats, alfalfa seeding, and spring wheat with excellent success though the rain necessitated a second spraying on a couple of plots.

The George Junior Republic was disturbed because its oat fields were being choked out by mustard so we took the train for Freeville. We put a field boom on a Watson potato sprayer but the pump had seen better days and our spray looked more like a rain than a mist, also, the mustard in many places was in full bloom so we were doubtful of our results. Again we were agreeably disappointed for only a few plants were not destroyed. When we inspected the work later we found that the eminent citizen of the Republic who had done the driving had supplied us with so many unsprayed portions that the field was striped like a zebra. Needless to state

"EVEN WITH THE POOR SPRAY THE RESULTS WERE GOOD"—RIGHT HAND SIDE SPRAYED AND MUSTARD DESTROYED, LEFT HAND SIDE UNSPRAYED

it made a striking demonstration. It was here, as the pictures show, that use was first made of our recently acquired knowledge about the ray filter.

A good farmer will never rest content while his fields are covered with mustard, not only because his yields are thus decreased, but because of the example to the neighborhood. Jared Van Wagenen of Lawyersville, up in the hills of Schoharie County, is such a farmer and for years he has carried on an up hill fight against this pest. The ground, however, is so saturated with mustard seed that even after fields have been kept clean for years they are yellow with it when a spring grain is put in. He had a hand pump mounted with a home made tank and to this we attached a field boom. Unfortunately our nozzles were built for large capacity and high pressure and so the hand pump gave us a poor spray. Had we used smaller capacity, lower pressure nozzles of the type of the "Tiger" and "Mistry Junior" the work would have been more satisfactory with this outfit. Even with the poor spray the results were good.

In all these places we used sulphate of iron and made our solution by dumping a 100 pound bag into a 52 gallon barrel of water and stirring with an old hoe for a few minutes. The sulphate dissolves like sugar and, if the solution is strained through a couple of thicknesses of cheesecloth as it is poured into the tank of the machine, there will be no trouble with nozzles clogging. From 40 to 50 gallons should be applied to an acre. As the sulphate of iron cost only about $1.10 per 100 lb. sack, our cost for spraying an acre ran from $1.25 to $1.50.

Copper sulphate has also been used to spray mustard with success and, in order to test out the comparative efficiency of these two sulphates, a 50 acre field near Gardner, N. D., was sprayed by Dr. H. E. Horton, one-half with the sulphate of copper and the remainder with the sulphate of iron. The effect on the mustard was the same with both sprays. Kinghead, an important weed of the northwest was not as severely injured by the copper as by the iron spray. The grain sprayed with sulphate of copper

THE FIELDS ARE YELLOW WITH MUSTARD WHEN A SPRING GRAIN IS PUT IN. FOREGROUND SPRAYED.

was two inches shorter than the other, not as healthy in color, and the heads were not filled as well. The cost was nearly the same in each case.

The attention of the Experiment Stations is being directed to this kind of work and eventually many of the weeds of our grain fields and meadows will be controlled by spraying. Judging from observations made by German agronomists and from some experiments in this country, dodder in clover and alfalfa can be eradicated by spraying. Satisfactory results are being obtained also with Canada thistle, sow thistle, the much dreaded weed of Manitoba, and with dandelions.

A LETTER FROM PROFESSOR ROBERTS

The December number of THE CORNELL COUNTRYMAN reached me this morning so I have one more thing to rejoice over, for it is a most creditable publication and gives evidence of the rapid progress which is being made in rural life and the extent of the means being used to promote Agriculture in State and Nation. I rejoice also because the farmers are receiving on the average a more adequate money reward for their capital and labor. Most of them can now look you in the eye since they are not watching out around the corner to dodge their creditors.

The high prices are indeed a little hard on those who have been Emeritused and do not fall into the Carnegie Foundation Class. Really it smooths out some of the wrinkles which appeared in my face when I was raising corn and selling it at ten cents per bushel and live porkers at two cents per pound, when I see the people who are determined to live in the city and get their living by simply passing things along, pay sixty cents for a

dozen eggs or a dozen pomelos and the same for two pounds of bacon. Well, they don't *have* to eat these foods if they don't want to. Out here in California, vegetables are cheap and abundant the year round but I notice that the foreigner who raises them still rides in the manure wagon while the men from Chickenville (Petaluma)and from Citrusville, (Redlands), twist the noses of their machines, and wave you a joyous farewell, only watching for holes in the road and that they do not exceed the speed limit.

Those well kept Citrus ranches what a joy to the eye, what a safe investment at $1000 per acre and what a certain profit of from 20% to 30% on the investment! Of course the thermometer gets up to 110 in the shade sometimes, but you don't have to sit in the shade if you don't want to.

This is certainly a land of surprises. This morning the roofs and sidewalks were covered with a thick coat of sparkling frost yet neither the pelargoniums nor but few of the nasturtiums show any tendency to wilt while the orange tree in the yard, though in bloom, shows no injury. The native Californian will tell you that the cold here is not like it is "Back East" and I am inclined to think that there is something in it, at any rate I know the fire-wood is not, for it makes you three times hot, once when you pay the bill for it, once when you prepare it for the stove and once when you burn it. Having studied practical political economy at Cornell, I pay the $12 per cord cheerfully, and rejoice that the man who secured the wood from the distant mountain side had his breeches nerve warmed when the golden dollars struck the bottom of his pocket. So I saw the wood and proceed to develop the second potential warmth wrapped up in those cords of natural mountain resources.

Whenever I write about rural life whether sedately or in a jovial strain, the thought of the farmer's right-hand man, the "hired man," comes up all unbidden and makes me wonder if in our haste we have forgotten him. All other classes of workers have some organization to look after their welfare. In this land of surprises some of the hired men appear to be getting a "square deal." The young man who delivers my milk gets $90 per month, the man who spades the gardens, forty cents per hour. Household help is still higher priced, the women receiving quite as much for like services as the men. However, there are vast numbers of ranch hands and track-menders who receive only ten cents per hour with board or fifteen cents without and who live in quarters quite unsuited to develop cleanliness, preserve health or promote good citizenship.

As I sit back and observe the struggle for wealth and the rush for pleasure I rejoice that my early pioneer life kept me on the even tenor of my way.

Palo Alto, Cal., Dec. 25, '10.
1148 Bryant St.

NOTES ON A NATIONAL FOREST

By C. P. Willis

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A traveller, boastful rather than truthful, and not too highly educated, had been recounting adventures in out of the way places. He stated that he had seen every part of the United States. A skeptical bystander dryly inquired whether he had ever been through algebra. "Certainly, and the number of cattle on the plains near there surprised me," was the unexpected reply. As a geographic name "Wenatchee" may seem to some as peculiar as "Algebra." A river, a town, and a National Forest on the eastern slopes of the Cascade Mountains in Central Washington have been thus designated, since Indians formerly spoke of the river valleys as "Wenatchee"—"The Outlet from the Hills."

The lower Wenatchee Valley was not long ago a desert. The first settlers discovered the great fertility of the soil, and the wonderful transformation water artificially applied would effect. Through irrigation desolate reaches of sage brush have given way to valuable orchards, producing apples and other fruit of exceptional size, flavor, and coloring. When these are flowering in the spring, the wilderness assuredly appears "to have blossomed like the rose." Rapidly as this section has developed, and the apple crop alone was valued at $3,000,000 in 1910, it is generally conceded that the future growth, both in fruit production and in population, will greatly exceed that of the past.

81627. A BURN ABOUT FOUR YEARS OLD. RANGER BREAKING CAMP IN LATE FALL TO GET OUT OF HIGH COUNTRY, INGALL'S CREEK, CHELAN CO., WENATCHEE NATIONAL FOREST, WASHINGTON.

The Wenatchee National Forest partially encloses the orchard region and extends from near the Columbia River to the summit of the Cascades. Its exterior boundaries embrace an

area almost double that of the State of Rhode Island, though part of the land thus included is privately owned. Timber from within the Forest, but not from government land, has been cut extensively and shipped east in large quantities. Lumber sawed here has been used in constructing a house in Massachusetts. Wenatchee apples have reached every continent on the globe. Since these are almost invariably packed in boxes manufactured locally, wood from within the Forest boundaries has literally been shipped "to the ends of the earth."

It is, however, improbable that much lumber from the Wenatchee Forest proper—from government land—will seek an eastern market. The practice of forestry differs from the usual management of private timber holdings. With the latter, the prime object is to secure the largest possible immediate return, and hence all merchantable timber, representing the accumulated growth of centuries, is logged as rapidly as feasible. Lumber for export is thus obtained, but to a great extent the forest is destroyed in its manufacture. On government land, on the contrary, it is aimed to secure the largest possible return in a much broader sense. Not only the present stand of timber is considered, but the productivity of the soil is likewise taken into account. Not only the immediate return, but returns throughout an indefinitely long period are sought. In consequence, not more timber than grows annually may be cut each year from the Forest. The possible annual cut will increase as scientific management increases the production, but there is nevertheless, little prospect of a surplus over the amount of timber needed locally, being supplied by the Wenatchee Forest. Within few years the wood consumption in the Wenatchee Valley alone will doubtless equal the production of the Forest. It will be largely through the prosperity of this Valley, that the people as a whole will benefit from the practice of forestry on the Wenatchee Forest.

79847. YELLOW PINE—SOME DOUGLASS FIR—SHOWING MIXED AGES. REPEATED FIRES HAVE THINNED OUT THE STAND. CHELAN CO., WENATCHEE NATIONAL FOREST, WASHINGTON.

The mere holding or "reserving" of

timber is almost as distinct from the practice of forestry as is logging without regard to future growth. Forestry has been defined as the "perpetuation of forests by wise use." From an economic standpoint it is obviously very important that a forest be used. It is likewise advisable from a silvicultural point of view that cutting of timber proceed. In a virgin forest, the deterioration of the stand balances its improvement, the growth is offset by the decay. If, however, mature timber is periodically removed, old, decadent trees are replaced by thrifty reproduction and the amount of wood grown per acre per year greatly increases. An analogy may show more clearly the difference between "reserving" timber and practicing forestry. A man, possessing a sum of money, may hoard it. So doing, he gains nothing. This represents the forest not used. On the other hand, the man may wisely invest his money. In this way, he not only secures interest but may also increase his capital. Similarly, where forestry is practiced, interest in the form of the annual timber cut is secured. The removal of hypermature trees, which are replaced by rapidly growing younger ones, results in an increased wood production, and the "capital value" the measure of the earning power—proportionately increases.

From the above considerations, it is evident that it would be advisable to cut each year from the Wenatchee Forest the amount of timber which annually grows. However, this is unfortunately impossible at the present time, owing to economic conditions of a local nature. There are great quantities of privately owned timber near and within the Forest boundaries and much of this must be logged before the government timber will be very greatly in demand. A beginning in logging on Forest lands has however been made and the annual cut will doubtless steadily increase until the production of the Forest is each year logged.

A beginning has likewise been made on this Forest in restocking areas at present unproductive, but capable of growing timber. The past fall tree seeds were sown on one hundred acres on a mountain slope where fire had totally destroyed the forest. This work will probably be pursued on a larger scale in the future.

In accordance with the governmental policy of making the best use—the fullest and the most lasting use—of natural resources, more than forestry must be considered in National Forest management. For example, there are extensive portions of the Wenatchee Forest where valuable forage exists. To utilize this, sheep are permitted to graze on government land during the summer months. When the Forest was created, there were included in it many isolated tracts of fertile land, more valuable for agriculture than for forest purposes. These have gradually been opened to settlement and are now, to considerable extent, under cultivation. There are not a few mines within the Wenatchee Forest, and the location and the working of these is encouraged. Water, a very important resource, is likewise utilized —for domestic purposes, for irrigation, for the generation of electricity—and only such restrictions are imposed by the govenment as are necessary to protect the interests of the public.

With an area as large as that within the Wenatchee, and with conditions in different portions as diverse as they are, the work of Forest officers must needs be varied. It has to do with timber sales and forest planting, with the supervision of grazing and other privileges allowed on government land, with the building of trails, cabins, and other improvements, with the protection of the Forest from fire, and with numerous other activities. The local force consists of a supervisor, a deputy supervisor, a forest assistant, a grazing assistant, and a clerk—who have general work—and a body of rangers, and their temporary assistants, guards —each of whom is assigned to a certain district in the Forest.

All the Forest is mountainous, but most of it can be reached in some way on horseback. Practically all the

81625. BAKING THE BREAD BEFORE THE CAMPFIRE. BREAD IS AFTER CALLED A "DOUGH-GOD".

men, therefore, own horses, and most of them have one horse for riding and one for "packing" camp equipment. It is largely through the use of the latter that any degree of comfort can be assured on the frequent extended trips through the mountains Forest officers must make. The usual pack consists of food in reasonable quantity and variety, cooking utensils, and blankets, with such other articles as tents, instruments, and tools, according to the desires of the traveller or the nature of his work.

Better maps than previously could be prepared are now being made of the amount, character, and distribution of the timber on the Forest. This work requires that the very inaccessible as well as the easily reached portions of the Forest be covered. Where the country is exceedingly rough, or where the density of the timber renders horse pasturage very scarce, it is necessary to travel on foot. In this case supplies must be "packed" upon the back of the traveller, and if long trips are to be made, only the equipment absolutely essential can be carried. Even where the minimum amount is taken, the pack, including food, blankets, a tarpaulin, a few cooking utensils and tools or instruments, commonly amounts to sixty pounds when a ten day or two week trip is proposed. Where walking would be difficult even were a man unburdened, there is slight danger of the weight of a sixty pound pack being unappreciated at the end of a long day's tramp.

One most important duty of Forest officers is the protection of the woods from fire. The fighting of fire often entails severe and long sustained labor with a liberal admixture of anxiety and discouragement. It is seldom feasible to actually extinguish a fire, but it is aimed to prevent its spread, to confine the damage to the smallest possible area. This is done in a variety of ways. No two fires are precisely alike, and differing conditions call for different measures. A "fire break" or "fire line"—a strip cleared of inflammable surface material—and under other conditions, a trench dug through the peaty soil to the mineral soil, are commonly used to check the spread of fires.

A story is told of a Forest ranger who, falling asleep one night in camp, dreamed. His first sensation was of falling through utter darkness for an unconscionable time. He then seemed to stand before a massive gate, which almost immediately swung open, dis-

closing a country he had no difficulty in recognizing as The Abode of His Satanic Majesty. The ranger turned to flee, but a gigantic fiend, suddenly appearing, flung him headlong within the gate. As the unwilling visitor slowly rose to his feet, he beheld a sight which somehow struck him as familiar. A vast fire lit up the scene and cast a terrible heat. Separated from the blaze by only a narrow open strip was a mountain of very inflammable material, to which, as he saw at a glance, the flames would soon spread. Around were multitudes of Shades of Former Men, apathetic and dejected. Before the ranger had gained his feet, he had collected his wits, and, remembering his past, had decided upon a course of action. A mighty yell from him attracted the attention of many Shades standing near. They flocked curiously about him while he briefly explained that he had been a Forest ranger on earth, knew all about fighting fire, and would insure their future comfort if they would implicitly obey him. Many instantly agreed, and he set them to work widening the space between the fire and the endangered mountain. Others joined the workers. For seeming ages the ranger labored, directing the Shades. From being a remote possibility, success in his difficult undertaking, became more certain. Finally came a moment when the ranger heaved a deep sigh of relief and stood aside to triumph in his victory—the fire could in no possible way reach the mountain, but must certainly if gradually die out completely from lack of fuel. The climate of the surrounding region would become, not only bearable, but agreeable. Suddenly a fearful tumult arose, the ground rocked beneath his feet, the mountain tumbled into the fire, and the ranger—awoke.

WOMEN IN DOMESTIC SCIENCE

By Mildred Dudley, '12

THE question has often been asked, "Why does Cornell University name its course in home training, Home Economics, while other colleges have the same course known as Domestic Science?"

A general name, simple yet comprehensive enough to cover sanitation, cooking and kindred household arts, and instruction in the art or science of living from the kindergarten to the college, was not an easy thing to find. After a long discussion there was agreement on the name "Home Economics" as the title preferable for the whole subject, and it was determined to consider it as a distinct section of the general subject of economics, so that it should find a logical place in the college and university course and not be confused with the mere "Household Arts" often taught under larger names. The latter, however important practically for the general public, could never expect to be recognized as a part of the University curriculum. While home economics was taken as a general term, it may be wise to use other phrases for its subdivisions; domestic economy might be appropriate for lessons for the younger pupils; domestic science might be applied in high schools where foods and house sanitation can be studied by scientific methods, while household or home economics would be suitable for a college course. This, then, is the reason why the New York State College of Agriculture names its course in home training "Home Economics".

Now that we see the full significance of the name let us turn our attention to its work and first of all to the preliminary work necessary. To register in the course the student must have the standard requirements, the same as for the College of Arts and Sciences. The freshman and sophomore years are almost wholly devoted to such subjects as English, drawing, biology,

botany, physiology, chemistry, physics and the like. These subjects are required and lay the foundation for the home economics proper. As for example, the courses in physiology and sanitary science, give instruction in the prevention of disease; also some instruction in home nursing and care of the sick. Chemistry plays an important part in the combination of foods and their care, while physics deals with the heating and lighting and mechanical appliances in the home. Drawing finds its application in home decoration, in planning houses and furniture. Botany and biology are exceedingly important in that they give the history of life, from the simplest to the most complex. When one comes to realize that the human body is composed of tiny microscopic cells all working together for a common good, yet each cell requiring proper nourishment to function properly, it gives us a new idea of life and its care. The science of home economics is very vital; perhaps people have not been thinking of it in that light, nevertheless it affects all people and generations of people perhaps more than any one thing. If the race is not properly fed, can it expect to have strong, healthy offspring?

Agriculture and home economics go hand in hand. Everybody admits agriculture is a vital subject because it deals with the production of the raw material; home economics on the other hand, deals with its care and preparation. It would seem that one is as important as the other, because many a good product is destroyed by unintelligent preparation.

The College of Agriculture trains its sons for scientific farming. Has it not equal responsibility then, in training its daughters to make the home a center of strength and healthful efficiency? The Department of Home Economics does this by training the girls not only to care for the food produced but to care for the health of those producing it.

If you were to visit some of the various classes in the College of Agriculture you would find that the men are quite concerned with the amount of potassium and phosphorus in the soil, and also the amount of protein and carbohydrates given their cows and pigs every meal. But is it not strange they never stop and think that the human animal needs like consideration? We know that our meals should contain all the various named foods in certain proportions, yet we are quite satisfied with any combination and preparation that the housewife chooses to set before us, provided of course that it is half way palatable. The welfare of the individual surely is of as much importance as the welfare of the crops or animals and this welfare depends in a large part upon the intelligent knowledge the women apply to the problems of the household.

Recent examinations of school children in various cities have revealed a state of physical ill-being most deplorable. Nutrition, which is an exceedingly important subject to the student, is always the first point of inquiry in such cases, because it is indicative to all other functions of the body. Many a child is punished for laziness, nervousness and irritability who really ought to be merely 'nourished' into energy and good temper. Strong tea or coffee for breakfast with perhaps a bun from the bakery, will not correct these difficulties nor is it the meal to be set before a child of the future. Home economics is beginning to have too strong a hold on the people to let this kind of a diet continue many more years.

People are ill nourished sometimes because of lack of means, but more often because of ignorance. A tender porterhouse steak needs little time or skill in preparation for the table, but its cost is far above the average income of the large family, while a scrag end of beef, with greater food value than the steak, could be well afforded; but it is often not used. Why? Because it requires most careful cook-

ing by one who understands the principles of meat cookery. Nevertheless, it is safe to say that this scrag of beef would cost no more and would be much more satisfying, to say nothing of its nourishing qualities, as compared with the bun, cinnamon rolls and the like, which the uninformed mass of people live on. This very sort of living makes the people poor because they are unable both physically and mentally to compete with the better nourished man.

The care and preparation of food to the student of home economics, while essential, is not the most important consideration. The science has to do with more vital subjects, one of which is nutrition above illustrated. Others which are of equal importance to the country and nation are the problems of extravagance, cleanliness of homes, markets, streets and cities, and the proper dress and shelter of our people. The one problem, which is greater than all these, is the problem of improving the present situation of society and the future of the race. Home economics cannot change this at once, nor it cannot change it directly, but it will be accomplished by the proper education of the homemaker and her influence upon the children.

At the present time many of our women are too narrow in their views for the well being of society at large. Country women are said to be hemmed in by the four walls of their domain, while their city sisters on the other hand are said to be too much interested in unproductive labor. Be this as it is, education will prove the remedy by making better and more delightful, comfortable homes. By making them full of life, beauty, simplicity and interest, it encourages higher education and broader views, consequently a better read nation; thus better citizens. We want not only to have a citizenship in this country that is free from disease, but one that is positively strong and vigorous and prepared for the severe tests that the twentieth century is going to put upon our bodies.

Housekeeping in the widest sense, is the provision of domestic comfort within the home. It is the largest single industry known, for what is there that does not in some way pertain to the household? Practically nothing! It is now becoming an accepted fact that to be born a woman is not as it once was, to be born a homemaker. Therefore, the girl in the family needs the wisest training possible to fit her for the responsible position which she is bound to hold in society, whether she realizes it or not. It has been said that the nation can never rise higher than its women. Therefore, let us educate our girls for their appointed field.

TENTH ANNUAL MEETING OF THE NEW YORK STATE FRUIT GROWERS' ASSOCIATION

By A. H. White, '12

ROCHESTER proved to be the center of attraction for the fruit-growers of New York during the 4th, 5th, and 6th of January, '11, at which time the New York State Fruit Growers' Association held their tenth annual meeting. Not only was it the most largely attended, but it was also the most successful meeting yet held. The fruit-show and the exhibits of orchard machinery proved to be features of the convention.

President Case, who was in Florida at the time, sent on his speech which contained an interesting comparison between the orchards of Florida and those of New York. In part it read: "I have been watching groves of oranges and grape fruit in Florida, comparing them with fruit orchards in

New York State, and find that one of the greatest necessities is the same in both places—the need of more humus and lime in the soil. I am more than ever convinced that the central and western portions of New York State are the most favored fruit sections of the world."

Then followed a three day program of speeches and "question boxes," all concerning fruit work. Among those who spoke were Prof. P. J. Parrott, Ent. at the Geneva Experiment Station; Mr. C. E. Bassett, Sec. Mich. State Hort. Society; Prof. Samuel Fraser; and from Cornell: Prof. H. H. Whetzel, Prof. C. S. Wilson, Prof. E. O. Fippin, Asst. Prof. Donald Reddick, and Mr. E. Wallace.

Perhaps the most important occurrence was the announcement that a big apple show would be held in Rochester next September. The event will be the largest event of its kind ever held in this State and it is expected to eclipse the great apple show held in Canada last fall. The main object of this move is to educate the people in the handling and use of apples and fruits generally, and indirectly to boost New York State fruit, and to prove that all the good fruit does not come from the west. All apple products and all orchard machinery will be represented, and the exhibits are to be made on a grand scale, from carload shipments down to individual specimens of fruit. Educational features will play a prominent part, and it is expected that Cornell will furnish packing, and also cooking demonstrations. The money with which to defray the expenses, about $10,000, is now being raised.

In the exhibition rooms this year, besides the various exhibits of nursery stock, fungicides, insecticides, sundry articles of the fruit grower's equipment, etc., there was a continuous demonstration of box packing of apples by the Cornell Department of Pomology. A special device used to assist in the boxing attracted considerable attention, and a circular was passed out showing detailed construction. The latest things in orchard machinery was shown in the basement, and the high powered gasoline tractors which are a development of the last decade tend to show the advancement being made in the field of fruit growing.

Over eight hundred attended the second annual banquet of the Association, which was in every sense a grand success. Dean Bailey was toastmaster, and in a short address told of the advantages of New York State as a fruit growing region, and pointed out that it was not the land but the people which was the all-important factor in fruit-growing.

An important piece of legislation was agreed on when delegates from several states resolved themselves into a committee to send into Congress a resolution to the effect that in the bill regarding the standardization of grades, packages, etc., the clause stating the size of box to be used should be dropped out in order that western and eastern fruit growers might come together and the bill put through.

The New Officers

The election of officers made in the old informal way of the sister society (Western New York Horticultural), resulted as follows: Clark Allis, Medina, N. Y., president; Samuel Fraser, Geneseo, N. Y., first vice-president; Luther Collomer, Hilton, N. Y., second vice-president; C. S. Wilson, Ithaca, N. Y., third vice-president; C. H. McClew, Burt, N. Y., fourth vice-president, and E. C. Gillette, Penn Yan, N. Y., secretary-treasurer. The executive committee remains as for the last year—namely, Frank Bradley Barker, N. Y.; L. L. Morrell, Kinderhook, N. Y.; Charles G. Porter, Albion, N. Y.; W. Ray Teats, Williamson, N. Y., and Eugene Collomer, Hilton, N. Y.

BEE KEEPING

By An Amateur

BEE-KEEPING on a large scale is a branch of farming that should only be undertaken by men or women who are fully trained to do the required work and who live in sections of the country where there is a good honey flow. Such persons can usually make as good a living by bee-keeping as by other branches of farming. In the southern part of New York State from November to March or in the colder parts of the State to April, the bee-keeper has generally little to do with the bees. This time is often used for painting hives, getting bee supplies ready for spring, and other similar chores. For this reason, poultry or orcharding fit in well with bee-keeping.

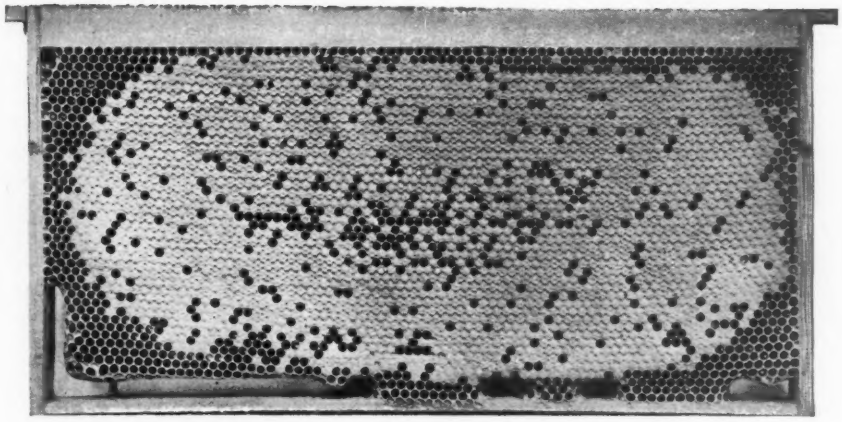
I am not writing, however, for bee-keepers on a large scale, they could not learn anything from me, but I pen this short article for amateurs or for farmers who may wish to keep a few hives to raise honey for their personal use, and to derive both pleasure and benefit thereby.

The word "keeping" in bee-keeping nomenclature has in addition to its agricultural meaning also the strictest literal significance. Cattle may be kept in enclosures, poultry if it is not desirable to have such at large can be kept behind poultrywire, sheep and hogs can be kept in similar ways. But bees have to fly far to gather honey and you could not keep them in their hives even if you fed them.

The natural instinct of starting a new family makes bees swarm in spring or early summer and it is at this point that the "keeping" is essential. To the observer, they give notice that they want to move. If we put the nicest bee-house near their hive they may not accept our invitation to occupy this new house, rent free because the bees have their own notions about which they won't tell us. The observer knowing all this puts the new house in order with frames that he may have left over from previous years, or else with new frames and "foundation." "Foundation" is a sheet of wax on which the size of the worker cells has been stamped and such sheets are imbedded in the new frames.

As soon as the swarm leaves the old hive it begins to go to a tree or bush in the immediate neighborhood likely to assemble all the deserters. The bees start a roar just like boys after playing a successful trick on somebody and the bee-keeper if he is not deaf will hear them. Now is his opportunity. He goes there with a basket, or a box, or a pail, or a burlap bag and tries to put the bees in, they can't sting now as they have filled their stomachs so full of honey that the bending of their bodies hurts them, for when they sting they have to bend their abdomen.

If the swarm is on a twig that can easily be cut with pruning shears it may be best to cut and to carry it over to the new hive. If it cannot easily be cut the bees can be shaken into a box or something else and taken to a hive. No bee-veil and no gloves will be needed, but for a beginner a veil might be advisable as he will not then become nervous if some of the bees fly around his face. After having secured the bees shake them gently in front of the new hive. The alighting board must be so adjusted that the bees can crawl up easily. Or take the box and set it on the new hive, the open part of the box downward on the open hive. You may throw burlap or other material over it so that the bees have to go through the hive if they want to get away. But in most cases they will be contented and in a short while they will settle down to business. To facilitate this it is advisable to put in a frame of "brood" partly unsealed as by this means the bees find work at once and forget their troubles. Naturally the queen has to be there or else you will find an empty



BROOD FRAME FROM LANGSTROTH HIVE
Courtesy A. I. Root Co.

hive the next morning. After the bees are down in the hive, take the box away and cover the hive. The old hive has some bees and brood left, mostly nurse bees and one or more virgin queens and these latter ones are apt to swarm also and take away with them more bees. Therefore, the bee-keeper may do well to get rid of the surplus virgins and leave only one as the new queen.

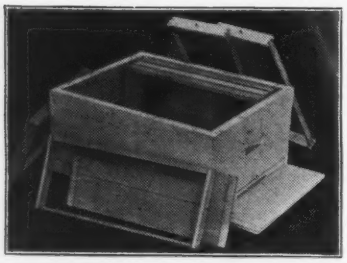
There are many difficulties one has to overcome to accomplish this, which will not be mentioned here as it would extend our short article too greatly. We have now two hives and if the old one is in good shape and the honey flow is good we may expect a fair surplus from the old hive.

Our new hive if filled with old frames will go to business at once as the queen will start without much delay to lay eggs. The scientists tell us that she lays three thousand or more eggs a day if she gets busy and if there is plenty of honey for the colony in sight. I never counted them, in fact, it took me quite a while to find the eggs when less than three days old and I was afraid that these small things might catch cold so I put back the frames quickly after seeing the white specks. Three days after you may find grubs and eggs and the bees won't sting you if you handle them right.

The explanation of the word "right," however, takes too much space for the limit our editors accord us. So you will have to read the bee-books and find out for yourselves if you wish to start in bee-keeping.

Besides swarming in order to start a new family bees swarm if they are short of honey, or unusually disturbed and it is of a certain disturbance that I wish to write.

The season of 1910 was an excessively dry one. The beginning was the best one could have wished, there was plenty of pollen, which is needed for the babies as honey alone would be too strong for them and then came a fine flow of white clover nectar. The bees were kept busy which is the best thing to keep them from stinging. The queen industriously laid eggs and as you need 50,000 or more bees in a hive and during the busy season they live only from four to six weeks you see that her majesty cannot be lazy. The bees know it and take from her all care of nursing the babies and not only that but also the care of feeding and cleansing the queen. They brush her, and cover her, and feed her with a specially prepared food which it is claimed is partly a product of the



HIVE WITH SOME OF THE FRAMES REMOVED
Courtesy of A. I. Root Co.

brain of the worker bees. As stated above the queen kept busy, there were plenty of bees and considerable honey came in, but in addition to the honey there came something else, the bee-moth or wax-moth. If you have once seen a comb in which Madam Wax-moth has lately deposited eggs you won't forget it if you are interested in the bee business. As I said the wax-moth, or let us say wax-moths, came without my knowing it and as I had to be away for a fortnight I could not watch the bees. They had over thirty pounds of sealed and unsealed honey in the "supers." The broodframes had their full quota and I felt as proud as a peacock on account of the management of my pet hive.

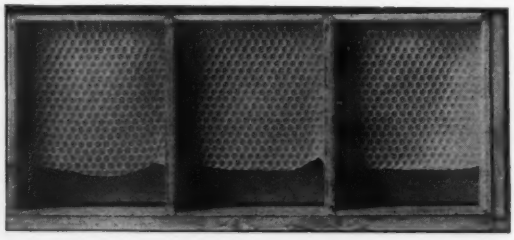
The bees were as gentle as bees can be and when I looked in just before I left for two weeks they were as unconcerned as they had been the whole season. During 1910, I received only a few stings some of which I get every year and generally do not mind them, though some I have minded, but that is another story.

After returning from my trip (it was evening and a little stormy) I went at once to see what the bees were doing. I did not see any outside and concluded they must have gone to bed early. Next morning I was up before them, at least I thought so, because they were not flying and I did not care to disturb the bees by opening the hive as it was cool. After breakfast, however, the sun shining briskly, I opened the hive and found no bees and no honey but instead wax-moths in all stages of growth. The bees had swarmed late in the season on account of this disturbance and they had moved to a hollow tree and stolen every drop of honey and there was yet the fall season before me with its golden rod, buckwheat, and aster honey to come.

So you see there is a difference between being a keeper of bees and a bee-keeper. This short absence cost me sixty pounds of honey including that which I usually get from the fall flow. If buckwheat is good I would even expect more.

If I had been present when the bees swarmed I would have managed it as described above and allowed them to carry back their own honey to the new hive which they are only too willing to do.

Bee-keepers like other farmers depend on seasons and it seems to me that there are no two seasons alike, but even if in some seasons the farmer should not receive much honey, his orchards, his grain, his garden, and his meadows are surely benefited by the bees in properly pollenizing the different plants. If good hives are used nearly every year some surplus honey can be gathered and I have found very few people who did not welcome this surplus.



THREE SECTIONS OF SURPLUS HONEY
Courtesy of A. I. Root Co.

LIVE STOCK INSTITUTE
Department of Animal Husbandry

PROGRAM

Monday, February 20th.

9:00 A. M. Lecture—Treatment of Cows before, during and after parturition. Prof. H. H. WING.
9:00 A. M. Lecture—Feeds and Feeding. Prof. E. S. SAVAGE.
2:00–4:00 P. M. Regular Judging Practicum, Judging Pavilion.
8:00 P. M. Regular Meeting of Round-Up Club. Talks by students.

Tuesday, February 21st.

10:00 A. M. Lecture on Horse Production. Prof. M. W. HARPER.
11:00 A. M. Lecture, Breeds and Breeding. Prof. H. H. WING.
2:00 P. M. Horse Demonstration and Judging. Prof. M. W. HARPER, Judging Pavilion.
8:00 P. M. Round Table on Swine Production. Discussion led by Hon. C. J. Huson.

Wednesday, February 22d.

9:00 A. M. Lecture, Treatment of Cows before, during and after parturition. Prof. H. H. WING.
9:00 A. M. Lecture, Outlook for Horse Production. Prof. M. W. HARPER.
2:00 –4:00 P. M.—Cow Judging Contest and demonstration. Open to all Farmers' Week visitors. No students can compete.
4:00 P. M. Round Table on Cow-testing Associations. A. J. NICOL.
8:00 P. M. Informal Live-stock discussion. Animal Husbandry Building.

Thursday, February 23d.

10:00 A. M. Lecture, Outlook for Horse Breeding in New York. Prof. M. W. HARPER.
11:00 A. M. Lecture, Breeds and Breeding. Prof. H. H. WING.
2:00–5:00 P. M. Meat Demonstration: Beef, Pork and Hot-house lambs.
8:00 P. M. Address, Prof. C. S. PLUMB of Ohio State College of Agriculture.
8:00 P. M. Address, Business prospects and opportunities of Livestock breeders. E. A. POWELL. Syracuse, N. Y.

Friday, February 24th.

9:00 A. M. Lecture, Treatment of Cows before, during and after parturition. Prof. H. H. WING.
10:00 A. M. Lecture, Care and Management of the Work Horse. Prof. M. W. HARPER.
2:00 P. M. Auction Sale of Livestock. Holsteins, male and female from Advanced Registry Stock; Jersey bull calves; Cheshire Swine; bred sows, boar and sow pigs.

NEW YORK PLANT BREEDERS' ASSOCIATION

PROGRAM

Wednesday, February 22d.

9:00 A.M. Dr. H. J. WEBBER—Breeding of Timothy.
10:00 A. M. Dr. H. H. LOVE—The Breeding of Corn with Special Reference to New York Conditions.
11:00 A. M. Hon. THEODORE C. BATES, Worcester, Mass.—Methods for Securing Large Yields of Flint Corn.
11:20 A. M. Mr. A. J. NICOLL, Delhi, New York—Some Plant-Breeding Results on the Delaware County Farm.

AT 2:00 P. M.

2:00 P. M. Dr. A. W. GILBERT—Breeding of Potatoes by Hill Selection.
2:40 P. M. Mr. T. E. MARTIN, Superintendent, New York Central Demonstration Farms, Syracuse, N. Y.—Potato Breeding.
3:15 P. M. Professor L. C. CORBETT, Horticulturist, U. S. Department of Agriculture, Washington, D. C.—The Work of the U. S. Department of Agriculture in Breeding Vegetables.
4:15 P. M. Mr. G. ARNOLD, (James Vick's Sons Seed Co.), Rochester, N. Y. —Improving Asters by Selection, Some of the Details.

AT 8:00 P. M.

Director L. H. BAILEY—The Outlook for Breeding.
Dr. H. J. WEBBER—Selection in Breeding.
Hon. W. M. HAYS, Assistant Secretary of Agriculture, Washington, D. C.—The Organization of Breeding.

Thursday, February 23d.

9:00 A. M. Professor U. P. HEDRICK, New York State Experiment Station, Geneva, N. Y.—The Breeding of Fruits.
10:00 A. M. Mr. SAMUEL FRASER, Geneseo, N. Y.—Propagation of Selected Types of Apples.
10:30 A. M. Mr. HERBERT P. KING, Trumansburg, N. Y.—Propagation of Selected Types of Peaches.
10:50 A. M. Dr. ROBERT T. MORRIS, New York City.—The Breeding of Nut Trees.
11:15 A. M. Mr. C. E. LEIGHTY, Cornell University—Breeding for Resistance to Disease.

AT 2:00 P. M.

2:00 P. M. BUSINESS MEETING. Called for the election of Officers and for the transaction of other important business.

An interesting and instructive plant-breeding exhibit is being prepared. Everyone interested in plant-breeding is requested to make additions to it.

The Cornell Countryman

S. G. JUDD, Editor
W. G. STEPHENSON - - Alumni Notes Editor
W. H. FRIES, D. G. WOOLF, A. H. WHITE, M. H. McCLEW - - - Associate Editors
C. F. RIBSAM - - - Business Manager
G. M. BUTLER, B. P. JONES, W. DE S. WILSON - Assistant Managers

FEBRUARY, 1911

A Spraying Number

It has seemed to us that spraying was a sufficiently important part of agricultural practice to deserve a special issue. Therefore, this "Spraying Number."

It is commonly remarked, "For every crop that grows there is some pest to hinder its growth or destroy it entirely.

Among these pests are various insects, fungous diseases, and our common farm weeds. For a long time the control of these has been a matter of study and experimentation among scientific investigators and practical farmers. Great progress has been made.

We can now say that for most of these pests we have a means of control, and for many practical extermination. The method of warfare in most cases is spraying. Effective spraying solutions have been compounded and successful machines for their application invented.

Articles on Spraying by men eminently fitted to discuss this problem, because they have obtained definite results by spraying not only orchards but farm weeds as well; together with articles on spraying machinery; comprise the major part of this issue. These articles merit the appreciation and serious consideration of our readers.

Farmers' Week

During the week of February 20–25th our College will be the Mecca of New York State farmers who come here primarily to get instruction in better methods of farming. The College is glad to have the citizens of the State look over this institution, which is their own, and see for themselves the work that it is carrying on.

The people who come to Cornell for this annual farmers' convention do not come here to criticize—they are not that kind of folks. But rather they recognize the fact that one is never too old to learn and appreciate that a staff of trained investigators, such as the faculty of this College, is sure to discover principles and methods which if put into practice by farmers will better the farms of the State and the people on the farms.

However, instruction in agriculture is not the only benefit our visitors will receive. They will get inspiration to live better, fuller lives on their own farms and to take an active part in the campaign for the betterment of country life. To hear Dean Bailey and to come in contact with him is a constant source of inspiration to every one of us who are students here. In the same way will our Farmers' Week guests be inspired.

There is another viewpoint. By mingling with the crowds that will

visit us from February 20–25th and talking with these people who daily wrestle with the problems of practical farming the students can very greatly increase their fund of agricultural wisdom. Aside from that, many lasting friendships can be formed. We urge the students to exert every effort to make our guests feel they are truly welcome. The gain will be mutual.

Speaking for the faculty and student body the CORNELL COUNTRYMAN extends to all those who visit us during Farmers' Week the welcome of the College of Agriculture.

Congratulations

Again Cornell students have triumphed in judging. This time the Poultry men received the laurels. The Students' Judging Contest held at the recent Poultry Show at Boston was won by the Cornell team, E. W. Benjamin, '11, and O. B. Kent,, '12, Teams from three agricultural colleges competed.

The CORNELL COUNTRYMAN congratulates these men on their victory.

The March Issue

The March issue of the COUNTRYMAN will be a "Farmers' Week Number." In it we will publish as many as possible of the leading addresses of the week. There will also be general reviews of the week's activities. The board of editors have considered that such a number would be valuable to those of our readers who were unable to attend Farmers' Week and would also form a permanent record of the week's events. We will illustrate the issue as far as possible by photographs taken during Farmers' Week.

In order to publish this number the paper cannot be sent to press until after February 25th. This means that the March issue will be somewhat late in coming out. We ask our readers to be patient as we think the material possible to be included in this Farmers' Week issue will be well worth the delay necessary for its publication.

Home Economics

Most of the students know that this College includes a Department of Home Economics. However, very few of the students and fewer people outside the college circle know much of the nature of the work which this Department conducts. In this issue Miss Dudley, a junior in Home Economics, clearly points out some of the reasons why young women study Home Economics.

That instruction in Home Economics is important was demonstrated last spring by the appropriation of funds by the State Legislature to build a five story building at Cornell University to house the Department of Home Economics.

For considerable time the colleges have been instructing young men in animal and plant nutrition and in farm management. Only recently has instruction been given to young women in human nutrition and management of the home. This latter result the Department of Home Economics is accomplishing. Is it not a worthy purpose and vital to the development of a nation? The rapid growth and ever increasing recognition of this Department justifies its existence as part of a great University and is a tribute to the members of its staff.

POULTRY EXHIBIT OF PENNSYLVANIA STATE COLLEGE

NOTES ON KILLING, PICKING AND PACKING POULTRY

By R. V. Mitchell, Sp.

THE Farmers' Week at the Pennsylvania State College was held Dec. 19–24. It proved to be one of the most successful Farmers' Weeks that was ever held at the College. Aside from the lecture and demonstration work, a number of the departments had very creditable exhibits. One of these exhibits that attracted a great deal of attention, was that of the dressed poultry and eggs.

Prior to this time, the Division of Poultry Husbandry had been making a test on fattening poultry. There were ten lots of birds used in this test. They were as near one age and size as was possible to have them. A number of different kinds of feeds were used, and the birds were fed by different methods. The purpose of this work was to show the farmer and poultryman what results could be obtained by using different feeds.

At the beginning of Farmers' Week, these lots of birds were killed, dry-picked and place on exhibition.

If the farmers are to receive the best and top-notch prices for their product, they must comply with the demands of those who purchase it. The highest-grade market makes it imperative that fowls should be neatly dressed; that the package must be neat and clean and that the product must be of blue-ribbon quality, for competition is keen.

In the east, farm poultry is generally sold without being fattened; much of it is in poor condition and therefore does not command the prices that it should. It may be sold to the consumer direct, but the major portion is sold to the wholesale houses and handled by commission men. In the west, most of the farm poultry is sent to the feeding station, where a special process of fattening is practiced and the quality of the birds is greatly improved. Some, however, is sent alive to the eastern markets.

It is important to have strong, vigorous birds to produce our market stock. They should be uniform in size and have well developed bodies. Mongrel stock should be eliminated from the farm and replaced with pure bred stock. They will be more uniform in size, color and quality.

Poultry should be starved for twenty-four hours before being killed. They should have all the water they desire to drink, as it will aid the body in getting rid of the waste products, and give a better appearance to the meat of the birds. The pens that are used to keep the poultry in should be sanitary.

Dry picking is the process of removing the feathers from poultry without the use of water. The bleeding is done through the mouth, by making one cut on the right side of the bird's mouth. If this cut is made accurately the bleeding will be very complete. At times it is more difficult to get good bleeding than at others, because the veins do not lie in the same position in all birds. Next the brain is pierced just enough to paralyze the bird but not to kill outright. When the brain is pierced it paralyzes the feather muscles, this causes the muscles to relax and the feathers can be pulled out easily and quickly. A knife with a narrow blade about two inches long can be used for this work. The best markets demand dry picked poultry. It is of better quality and will keep better than scalded poultry. After the chicken is killed and dry picked, it is necessary to cool it properly, and this should be done gradually, by

ONE CORNER OF THE POULTRY EXHIBIT AT PENNSYLVANIA STATE COLLEGE DURING FARMERS' WEEK.

leaving in a room of medium temperature for about 24 hours. The heads of the birds should be wrapped in white parchment paper, in order to keep the blood from getting on the bodies when they are packed in boxes for shipment; also it gives a more attractive appearance to the dressed bird. Fowls should be graded closely, the best ones being put in the same package. A box of poultry is judged by the poorest bird that it contains. The boxes should be made of ⅜″ and ⅝″ lumber. A box 16″x18″x8″ will hold one dozen birds that will weigh from four to five pounds each, in two layers of six each. The heads and feet are so folded as to be in the center of the box. The object in doing this is to have a more attractive package, for an attractive package makes many sales. No matter whether the top or bottom of the box is opened, the appearance will be the same.

For the exhibit, part of the poultry was packed in this way, while several lots of birds were arranged on shelves. A card was placed with each lot giving the following data: Pen No—Kind of feed used—Method of feeding—Gain in pounds for the entire period—Cost per pound gain. This gave the observer a chance to see what feed was used and the method used in feeding. They could see which feed produced the best birds at the lowest price. At the close of the week the birds were shipped to a dealer in New York City.

There was also a good collection of eggs, which were representative of the most important breeds of poultry. There were a number of plates from the different breeds kept at the College Plant. Poultry breeders from various parts of the state contributed largely to the exhibit. There was also a collection from a number of the breeds kept at the Poultry Department at Cornell University, which added greatly to the exhibit.

CAMPUS NOTES

The first assembly of the year was held Wednesday evening, January 4. The meeting opened with Alma Mater, followed by a selection from the Glee Club. This was followed by a piano solo by Robert E. Dent, '14.

Dean Bailey then addressed the students on the problem of soil conservation. As an illustration of the ways by which persons unacquainted with the facts would go about it to solve the problem, Dean Bailey read a bill proposed before a State Legislature. The bill provided that it would be unlawful to plant small grains or a cultivated crop on land that had been used for these crops the year before, and provided for a penalty of 10–25 cents per acre in case of violation of the law. The real solution to the problem, Dean Bailey said, lies in the education of the public to the advantages of soil conservation and in fostering a public sentiment that will forbid abuse of the soil. The soil is the greatest of our natural resources and no man has the right to abuse it.

The closing part of the address was devoted to the reading and the discussion of Edwin Markham's "The Man with the Hoe" and "The Winding Road." After closing the meeting with the Evening Song a social hour was enjoyed.

* * *

The following competitors made the first competition for the Eastman Stage: W. R. Hook, E. W. Peterson, C. L. Zinssmeister, C. G. Wooster, F. E. Rogers, H. B. Knapp, E. H. Meyer, C. E. Ladd, E. L. Bernays, E. P. Smith, T. E. Elder, D. Elder. The final cut took place January 27, when the number of competitors was reduced to six.

* * *

Monday evening, Dec. 19, Mr. F. S. Peer gave a very interesting talk on English Live Stock before the Round-Up Club. Mr. Peer is an importer of English live stock and is the author of two books on live stock subjects.

* * *

Thursday, Jan. 12, Prof. H. H. Wing delivered a lecture before the Michigan Breeders Association, at Lansing, Mich. He talked on the improvement of Holstein cows, in the light of Advanced Registry Records.

* * *

Prof. Stocking talked to the patrons of a creamery at Oswego on the value of Cow Testing Associations. It is probable that an Association will be formed in the near future.

* * *

Dr. Webber spoke before the New York State Breeders' Association at Syracuse on Jan. 11.

* * *

Several of the Departments sent exhibits to the National Corn Show which was held at Columbus, Ohio, early in February. The different Departments will be represented by Dr. Webber, Dr. Love, Dr. Gilbert, and Prof. Fippin.

During Farmers' Week, there will be an address by Prof. W. H. Day of the Ontario Agricultural College, on "State Aid to Land Drainage." Mr. Williams of the U. S. Dept. of Agriculture will speak on "Irrigation in Humid Climates."

* * *

The Cornell Poultry Judging Team, consisting of O. B. Kent and E. W. Benjamin, carried off first honors at the Boston Poultry Show in judging Fancy Poultry. The standing of the teams was as follows: Cornell, first; Ontario Agricultural College, second, and Maine Agricultural College, third. The birds to be judged were: Class 1, Five White Leghorn Hens; Class 2, Five Barred Plymouth Rock, Cocks; Class 3, Five Buff Orpington Cockerels.

Fifteen minutes were given for judging each class and the writing of the reasons for placing the birds. Two men were on each contesting team and after the birds had been placed, by the individual men, they were placed by a squad of competent judges. The placements and the reasons of the members of each team were then gone over by the judges and the scores averaged together to give the final team score. The placements of the birds and the reasons for placements were given equal value in computing the scores.

Cornell's good lead was materially increased by the fact that both members of the team noted a disqualification on one of the birds which was unnoticed by all the other contestants.

The first prize awarded by the Boston Show was $10 cash the second prize, $5. A second contest in judging utility stock was also carried on and in this contest Cornell was awarded second prize. The prizes here were ribbons to the first and second teams.

The interest in the student contests was very strong at the Boston Show and arrangements are being made for a continuance of the contests on a much enlarged plan, in following years. The Boston Show is coming to be one of the most popular shows in the country. A committee is to be appointed at once to take charge of this event next year.

The judging team was chosen by competition among the members of the class in Advanced Poultry Judging. The team left Ithaca on Monday evening, Jan. 9, and returned to the Rochester Show from Boston, Thursday, Jan. 12. The trip was enjoyed throughout and some valuable data upon the condition of the egg market in Boston was obtained by Mr. Benjamin.

* * *

The American Plant Pathologists have recently formed an organization known as the American Phytopathological Society. They will publish a journal the official organ of the Society, to be known as *Phytopathology*. It will be published from Ithaca. The editorial board consists of: Dr. L. R. Jones, University of Wisconsin; Prof. C. I. Shear, U. S. D. A., Washington, D. C., and Prof. H. H. Whetzel, Cornell University. Dr. Donald Reddick, Dept. of Plant Pathology, Cornell University, is business manager.

* * *

The Winter Course class in Home Economics of the New York State College of Agriculture has been as large as the capacity of the department would permit. The class numbering thirty, is taking laboratory work in foods, in sewing, cutting and fitting and daily lectures upon foods, sanitation, household management, house planning and furnishing.

* * *

For the first time the Junior and Senior banquets for the students of the New York State College of Agriculture have been served in the buildings of the College. They were prepared by the women students who are members of these classes and registered in the Department of Home Economics. Tables were spread in the long hall of the Home Economics Department. The Senior Banquet had present over

fifty, and the Junior Banquet about seventy-five members of the class.

* * *

The Homemakers' Conference is an organization which meets at the College in connection with Farmers' Week with a program prepared by the Home Economics Department. This organization is officered by women of the state and is a short course of one week for homemakers who wish to be in touch with the latest scientific methods of housekeeping. The program for next Farmers' Week consists of a course of lectures upon Foods by Miss Flora Rose; one upon Household Management by Miss Martha Van Rensselaer; a course upon house planning and furnishing by Mrs. Helen Binkerd Young. These women are connected with the Department of Home Economics. In addition, Mr. Howard Riley, Professor of Farm Mechanics, will give a course upon Water Supply, Sewage Disposal, House Lighting and Heating. An Appreciation Course will be introduced; one lecture upon music in the home; another upon pictures; one upon books. Dean Bailey will give one lecture of this course upon the value of growing plants.

* * *

February 22d, is a legal holiday in the public schools, and as it occurs during Farmers' Week, the teachers will be invited to an all day's program in the College of Agriculture, the meetings to be conducted by Professor George P. Bristol, Dean of the Summer School, and the newly appointed Supervisor of the Education Department of the University. The main subjects of the day will be Agriculture and Domestic Science in the Public Schools.

* * *

The members of the staff of the Home Economics Department attended the New York State Teachers Association at Rochester in December. Miss Van Rensselaer is Presi-
nt of the State Home Economics
ociation which held a section meeting at this Association. Miss Rose is Secretary. Mrs. Helen Binkerd Young read a paper upon "Rational Domestic Art as Applied to House Furnishing." Miss Van Rensselær read a paper in the Industrial Section of the Association on "Domestic Science in the Course of Study."

* * *

A most interesting lecture was given January 16th, in the Dairy Lecture Room by Mrs. Ware, widely known by the fame of Wareland's Dairy Farm, Higland Lake, Massachusetts. Mrs. Ware was a pioneer in the production of clean milk and the first to send certified milk to Boston. By close application to business and by taking advantage of the methods used by those successful in the dairy industry, Mrs. Ware has built up a very profitable business. A new feature of a dairy farm is the Summer Dairy School which has been conducted during the past few summers at Warelands. Each summer this school or "camp" as Mrs. Ware calls it, grows larger. Mrs. Ware emphasized the satisfaction of putting an absolutely pure product on the market and said that the secret of success was giving your customers exactly what you said you were giving them. Miss Constable who is Mrs. Ware's chief assistant took the short course in Dairy at Cornell last year.

* * *

In recent numbers of both the *Horse World* and *The Horseman* and *Spirit of The Times* have been quoted extracts from Bulletins written by Professor M. W. Harper of the Department of Animal Husbandry. The *Horse World* in an editorial says, "We can refer to nothing better on the 'Care of the Driving Horse' than a bulletin by Professor Harper." This recognition of Professor Harper is especially gratifying because it comes from publications entirely outside of college circles. The Bulletins referred to are from a series on Horses prepared for the Farmers' Reading Course. We advise all horsemen or

those who desire to become horsemen to obtain them.

* * *

Professor E. S. Savage recently addressed the meeting of the New York State Guernsey Breeders' Association.

* * *

Professor John Craig, secretary of the American Pomological Society, is mailing the Report of the Thirty-First Session of that society to all parts of the United States and Canada.

* * *

Lex R. Hessler, a graduate of Wabash College, Ind., began graduate work in the Department of Plant Pathology, Jan. 1. He is holder of the Byron fellowship, established by the Byron Fruit Growers' Association, South Byron, N. Y.

* * *

Professors H. J. Webber, H. H. Wing, and Dr. Milks represented Cornell at the convention of the New York State Breeders' Association at Syracuse, January 11. Professor Webber spoke on "Breeding Corn and Forage Crops on New York State Farms." Dr. Milks' subject was "The Control of Hog Cholera."

* * *

At the meeting of the New York Agricultural Society held at Albany, January 18 and 19, President Schurman spoke on "The Policy of Agricultural Education in New York," while Dean Bailey discussed the development of the hill lands. Other speakers were: Governor Eberhart, of Minnesota; Governor Dix, of New York; President Brown, of the New York Central Railroad; President Creelman, of the Ontario Agricultural College; State Master Hull of the Michigan State Grange.

* * *

New bulletins issued by the College are: Number 288, "Spray Injury Induced by Lime Sulphur Preparations;" Number 289, "Lime Sulphur as a Summer Spray;" Number 290, "A Study of Fungicide Value of Lime Sulphur Preparations," by Errett Wallace.

* * *

At the regular meeting on January 17, the officers of the Agricultural Association for the second term were elected as follows: R. A. Mordorff, '11, president; E. C. Auchter, '12, vice-president; Miss M. F. Dudley,'12 secretary, and H. B. Knapp, '12, treasurer.

T. Bradlee, '11, was elected to the executive committee A vote of thanks was given to the retiring president. A gig committee of twenty members was appointed.

* * *

Forty-six students, mostly short-course students in the poultry course, went to Rochester with Professor Rogers, January 12 and 13. They attended the Rochester Poultry Show, at which the students entered the Judging and Picking Contests. The judging contest for fancy poultry was won by Mr. Kent, with Mr. Benjamin second, Mr. Masland, 3d, and Mr. Steitz, 4th. In the killing and picking contest, Mr. Brown was first, killing and dry plucking his two birds in 20 minutes and 30 seconds and leaving them in the best of condition. Mr. Lambert was second, finishing his in 19 minutes and 50 seconds and Mr. Utley third in 18 minutes, but leaving them in poorer condition.

On this trip, three important poultry farms were visited: Mrs. Hooser's at Geneseo; Mr. A. P. Rogers' at Bergen, and Mr. Roy Dunn's at West Henrietta. On Saturday, Mr. Wyckoff's Poultry Plant at Aurora was visited.

* * *

Professor Rogers attended the Farmers' Week in Maryland, January 16–26, and delivered three lectures. He will also attend Farmers' Week in Maine, February 21–22.

* * *

Professor Rice was present at the Farmers' Week of the Missouri State College, at Columbia, Mo. During the week he delivered addresses on the

following subjects: "The Destiny of the Missouri Hen;" "Feeding Fowls for Egg Production;" "Rearing Chickens by Cornell Range Methods," and "Constitutional Vigor."

* * *

The Department of Poultry Husbandry is staging from one to three educational exhibits every week at poultry shows throughout the state.

* * *

The Department of Poultry Husbandry has a record breaking hen who has laid 258 eggs during the past year. Another hen is a close second with a record of 253. Fifteen selected hens have averaged 238 eggs, and a flock of twelve have laid 182 apiece.

* * *

The Department of Farm Mechanics is planning a very extensive program for Farmers' Week. A water supply system will be set up and be in operation. Probably a farm lighting system will also be on exhibition. As a result of the tests recently completed, a large assortment of hand spray pumps tractor spraying machines, and spray nozzles will be on hand and in operation during the week.

* * *

L. A. Fuertes, '97, talked on Birds before the Cornell Poultry Club on January 9. He imitated some of their calls and songs. A debate was held on the subject: Resolved, that the hot water pipe system of brooding is more desirable for the raising of chickens than the Cornell gasoline colony system.

* * *

In a Sanitary Science Lecture on December 20, Dean Bailey compared the health in rural and urban communities, showing the many advantages of the former, but emphasizing the need for improvement in both. He laid stress on the fact that farmers are not given to feasting late at night as in the case of the injurious city banquets.

* * *

Dean Bailey's book, "Plant Breeding," dealing with the amelioration of domestic plants, has recently been translated into Japanese. There is also a French translation of this book. The Chinese have asked permission of the Dean to use his books.

* * *

S. H. White, '12, gave a talk on "Snails" before the Agassiz Club, January 5.

* * *

Prof. Whetzel spoke at the Massachusetts Horticultural Society meetiing Jan. 21, on "The Local Plant Doctor."

* * *

The Department of Pomology is putting into operation a new plan for giving assistance to fruit growers throughout the state in orchard management. The Department is to (1) Survey the Orchard; (2) Study the Soil Conditions; (3) Furnish the Owner with Plans for Fertilization and Cultivation; (4) Direct Pruning of the Trees; and (5) Give Aid in Marketing Plans. For the first year this work will be limited to a small number of orchards. The only cost to the grower will be the traveling expenses when it is necessary to visit the orchard.

* * *

One-half the students of the class in Systematic Pomology did all the judging at the New York State Fruit Growers' Association meeting at Rochester, Jan. 3–4–5. The other half of the class judged at the Western New York Horticultural Society meeting held at Rochester, on Jan. 25–26. At the latter meeting there was also a fruit judging contest for the Winter Course students in Commercial Fruit Growing.

* * *

Mr. E. Wallace has been appointed Investigator in the Department of Plant Pathology and will study the fungicidal possibilities of sulphate of iron.

* * *

Dr. Reddick was the principal speaker at the Chautauqua Horticultural Society meeting at Northeast, Pa.

FORMER STUDENTS

WALTER MULFORD, '99
Recently appointed Professor of Forestry in the New York State College of Agriculture

Walter Mulford graduated from the College of Agriculture in 1899, with the degree of B. S. A. The two following years were spent in the New York State College of Forestry at Cornell, from which he graduated in 1901 with the degree of Forest Engineer. During the next three years he was Forester to the Connecticut Agricultural Experiment Station of New Haven, and during the same period served as State Forester of Connecticut. He also taught in the Yale Forest School in the summer term of 1902 and the fall term of 1903, and was President of the Connecticut Forestry Association from 1903 to 1905.

From July, 1904, to September, 1905, Mr. Mulford was employed in the United States Forest Service. In the fall of 1905, he went to Ann Arbor, Mich., as Assistant Professor of Forestry, in the University of Michigan. Promotion to a Junior Professorship came in the fall of 1907, a position he has held to the present time. The head of the Forestry Department at Ann Arbor is Filibert Roth, under whom Mr. Mulford was a student while in the New York State College of Forestry.

Since going to Ann Arbor, Mr. Mulford has been employed three summers by the United States Forest Service, and one summer on private forestry work. Another summer was spent in Europe in the study of forestry methods. His work has taken him into thirty-six states of the United States.

Mr. Mulford was a member of the board of editors of the *Forestry Quarterly* in 1903 and 1904, and from 1909 to the present time. He is a member of the Society of American Foresters and of Sigma Xi.

Mr. Mulford was married on July 1, 1903, to Vera Wandling of Ithaca. They have one child.

Mr. Mulford has been appointed Professor of Forestry in the New York State College of Agriculture. Although he does not move to Ithaca until next summer, he will spend much of the present winter at Cornell in getting the forestry work started.

'97, B. S. A.—H. G. Carrell, of the Semet Solvay Company, has been transferred from the Chicago office to the home office of the company at Syracuse, N. Y.

Special '01–'02—Mr. H. S. Williams visited the college, Jan. 13th and 14th. Mr. Williams is the manager of the farm at the Lincoln Agricultural School, Lincolndale, N. Y. He was for two years previous to coming to Lincolndale, connected with the farms at Derry, N. H., of the H. P. Hood's Sons of Boston, extensive milk dealers.

'04, A. B.—Mr. C. W. Howard, who is now government entomologist of Portugese East Africa, has been granted a leave of absence and will return to the United Staes this summer. Mrs. Howard was Miss Anna B. Townsend, '03.

Sp., '04—S. R. Clark writes from Onondaga Valley, N. Y., that he now

has full responsibility for maintaining the old family homestead. We remember Clark as the kind of young man in whose hands it is safe to trust a family homestead.

'05, B. S. A.—Carol Aronovici, who is in charge of the Union Settlement House of Providence, R. I., has written an elaborate statistical monograph on "Some Nativity and Race Factors in Rhode Island," and the work has been published by the Rhode Island Bureau of Industrial Statistics as a part of its annual report for 1909.

'07, B. S. A.—Scott H. Perky and Mrs. Perky, who have spent the fall in the mountains of North Carolina, are now in Los Angeles, California, where they expect to remain for some time.

'07, B. S. A.—John B. Shepard writes from San Marcos, Texas, that he is still operating in south Texas, building irrigation works and looking after a number of farms. He expects to change his headquarters in the near future but does not yet know his next location.

'08, M. S. A.—C. F. Niven in a letter to Prof. Wilson states that since obtaining his Master's degree he has been in the North Georgia Agricultural College.

'08, B. S. A.—For the past two years C. J. Grant has been working with the Dairy Division of the Bureau of Animal Industry investigating the manufacture of cheeses in this country especially the camembert and roquefort types, the first of last January entered upon the duties of Assistant in Agronomy at the Ohio State University at Columbus, Ohio.

Sp., '09—T. M. Scoon, Geneva, writes that he put up a large barn on his farm this past summer and that he has bought a lot of steers which he is feeding this winter.

'09, Ph.D.—Dr. C. F. Clark, who left this institution last summer to take up the work of breeding plants resistant to disease, in connection with the Department of Agriculture, visited the college during the Christmas holidays and attended the meetings of the American Society of Naturalists.

'09, Ph. D.—J. H. Squires has recently been promoted and is now head of the Department of Agronomy in the New Mexico Agricultural College.

'09, B. S. A.—E. W. Mitchell, who is the owner of a fine fruit farm near Kinderhook, N. Y., is assisting in the Winter Course work of the Department of Plant Pathology.

'09, B. S. A.—Paul Judson has purchased a fine fruit farm at Kinderhook, and in connection with his brother, Prof. L. B. Judson, is planting 4000 yearling apple trees. A progressive Pomological Society has been formed in that section and we expect to see and hear great things about the Kinderhook Country in the future.

Sp. '09. E. I. Bayer was married January 13th to Miss Southworth, of Geneva, N. Y. The wedding was held at the bride's home. Mr. and Mrs. Bayer will reside at Toledo, Ohio, where Mr. Bayer is junior partner with his father in a large vegetable and cut flower business.

'10, B. S. A.—K. B. Lewis has accepted a temporary position with the United States Department of Pomology. He is studying and investigating transportation and marketing problems of fruit in Florida.

'10, Ph.D.—Dr. E. P. Humbert, who took his doctor's degree last spring has been appointed special agent to carry on work in farm management in connection with the United States Department of Agriculture. Dr. Humbert took charge of this work about the first of last September.

'10, M. S. A.—Mr. H. B. Cowgill has been appointed plant breeder of the Cuban Sugar Refining Co. He is engaged at the present time in the selection and breeding of sugar cane to secure greater yield and increased sugar content. Mr. Cowgill has a position of very great opportunity and some very fine work from him is to be expected.

The following excerpts have been taken from the Round Robin Letter of the Craig Club of '09–'10:

'10, W. H.—Chas. F. Bley, one of the best known "Short Horns" of the 1910 class, when last heard from was orchard foreman of an orchard of 13,000 trees at Point Breeze, N. Y.

'10, W. H.—Sprague is located at the Thurner Hill farm at Ipswich, Mass. He is employed as foreman of the fruit department.

'10, W. H.—W. P. Harris exhibited some very fine boxes of fruit at the Maryland Horticultural Society's meeting.

'10, W. H.—Hamilton has purchased a ten acre farm near Gasport, N. Y. He is specializing in the production of berries.

Ex., '10—On December 28th, last, Margaret Perry Stanion, daughter of Mr. and Mrs. Chas. B. Stanion, of Ithaca, N. Y., was married to Floyd Nelson Darling of South Montrose, Pa. Darling was a prominent man in his class being a debater and the Ivy Orator of the class of 1910. Mr. and Mrs. Darling now make their home at South Montrose, Pa., where Mr. Darling holds a position as superintendent of the Ballantine farms.

Sp., '10—Walter G. Page who was married last October to Mary C. Williams is now living on his father's dairy farm at West Edmeston, N. Y.

'10, B. S. A.—Cornelia F. Kephart is assistant in zoology in the New Hampshire State College and Experiment Station at Durham, N. H.

GENERAL AGRICULTURAL NEWS

The annual meetings of the New York State Dairymen's and the Butter and Cheesemakers' Associations ended at Ogdensburg last week with a very enjoyable banquet, at which Dean L. H. Bailey of the State Agricultural College was the honored guest. One commendable feature of the meeting was that the program was carried out and no absence explanations were necessary. While many interesting subjects were prominent, nothing specially new was said, and the value of the meeting was determined by other things. One of these was cow testing associations, whose practical workings were explained by a dairyman who is a member of the only one in St. Lawrence county. The results secured by this association have been an increase of 33 1–3% of butter fat in the dairies connected with it. The speaker would have a Babcock test in every rural school, as the machine would supply interesting object lessons throughout the district.

Pres. Fredericksen of the Dairymen's Association made an important recommendation in his annual report, viz.: that because, under the present order of things, when the convention is held in the northern part of the state, dairymen from distant parts do not attend, and the same thing is noticed when the convention is held in central, western or southern suburbs; he recommends one large convention to be held in the central part of the state and the smaller ones in the various sections each year, so that the dairymen of every county might attend without traveling long distances.

Commissioner Pearson explained the methods and management of the Department of Agriculture with respect to changes made and contemplated in the dairy law. Dr. Bailey delivered a philosophical address, which could have been listened to with much profit by the United States Senate. He drew a distinction between the country life movement and the back-to-the-land movement. One, he said, is an evolution in our national existence, the other only a little ebullition on the present surface.

* * *

The Fourth Annual National Corn Exposition was held at Columbus, Ohio, from Jan. 30 to Feb. 11. Eminent speakers from all parts of the

country were present at this Exposition. The Experiment Stations and Agricultural Colleges of twenty-five States each presented, in a graphic manner, some feature or features of their most advanced experimental work.

These exhibits, which were in charge of expert demonstrators, dealt, in a practical way, with nearly every phase of the science of agriculture. For instance, North Carolina emphasized the cotton industry from the growing plant to the manufactured article, with cotton gin and loom in actual operation, while Illinois especially emphasized its soil work. There was a wonderful showing of results in agriculture, based on scientific investigation.

* * *

The 36th annual meeting of the Ayrshire Breeders' Association was held at Hotel Manhattan, New York, with about seventy-five members and invited guests present.

The election of officers resulted in the choice of Mr. John R. Valentine, Bryn Mawr, Pa., president; Dr. J. A. Ness, Auburn, Maine, George E. Pike, Gouverneur, N. Y., J. W. Clise, Seattle, Washington, J. W. Ogden, Morristown, N. J., vice-presidents; C. M. Winslow, Brandon, Vt., secretary and treasurer; George H. Yeaton, Dover, N. H., auditor; Charles H. Hayes, Portsmouth, N. H., and John W. Oakey, Bryn Mawr, Pa., executive committee for three years.

A banquet was served of 44 covers, after which President Valentine gave a very interesting and instructive talk on Scotland and the Ayrshire cow, illustrated by stereopticon views of the two types of cows found in Scotland, the dairy type with a marked dairy conformation of large udder and long teats, and the vessel type so called, being the show ring Ayrshires of Scotland, which are kept simply for showing in the ring.

The concensus of opinion at the meeting was that it was the largest and most enthusiastic meeting yet held, and that the outlook for the perfect cow, was never so hopeful.

* * *

National Corn Day was observed Friday, Feb. 3, throughout the country. At the Exposition, the National Corn Banquet was held on the evening of the third. At this banquet, Secretary of Agriculture, James Wilson delivered an address on "The Evolution of American Agriculture." This banquet was the largest purely agricultural banquet ever held. Subjects of importance relative to the consumption and production of corn were threshed out. The menu was one of greatest excellence and consisted entirely of corn products, every form of corn food being served. Plates were laid for 1500 guests on this occasion, the feast being served in the main Auditorium of the Exposition.

The National Rural Life Conference was in session, Feb. 7 to 10. Among the speakers at this Conference, was L. H. Bailey.

The American Breeders' Association met at the Exposition during the first three days. Problems of animal and plant breeding were discussed.

* * *

At the Reading Terminal Market, in Philadelphia, states *The National Stockman and Farmer*, several carloads of apples grown east of the Allegany Mountains were exhibited during January. Every apple was sold on the market during the show or afterwards. But the rooms were kept full, new shipments taking the place of those sold. The fruit shown was labelled with the grower's name and address, and a statement as to where grown. Visitors could see exactly what has been done in any locality represented.

The object of this show was to demonstrate that apples grown in Eastern states are as good in color, size, shape, flavor and texture as the high-priced western fruit.

Although the United States is the greatest cotton-producing country in the world, a large quantity of this staple is imported from Egypt every year. The variety of cotton most extensively grown in Egypt is known as the Mit Afifi; it has a soft, rather crinkly fiber of a characteristic light brown color that renders it especially useful for certain classes of cotton goods in which the natural color of the fiber is retained.

The best Egyptian cottons bring a price second only to that paid for the highest grades of Sea Island, being used solely in the manufacture of the finest goods. They are especially suitable for mercerizing, taking this process better than the native American cottons, and are largely used for mixing with silk and for the manufacture of cloths in which a high finish and luster are required. In 1909, the import of cotton from Egypt amounted to 72,617,893 pounds, valued at $12,101,000.

In view of the considerable value of this import, the U. S. Department of Agriculture is endeavoring to develop Egyptian cotton culture in the United States in order to supply the American market with a homegrown product. As a result of experiments that have been carried on for the past seven years in acclimatizing and breeding Egyptian cotton in the Southwest, several distinct types have originated from the stock of imported seed of the Mit Afifi variety with which the work was begun. Two of these are as distinct in the characters of the plants, bolls and fiber as some of the newer varieties which have originated in Egypt from the Mit Afifi. A third promising type is an improved acclimatized strain of Mit Afifi rather than a new variety.

Spinners who have examined samples of the acclimatized Egyptian fiber grown last year in the Southwest pronounce it to be in every way as well adapted to their requirements as is the imported cotton of corresponding grades.

* * *

The Parcel's Post is still being discussed. President Taft, in his message, suggested it be given a trial. The Postmaster General has said the same thing but advises putting it on a paying basis. He holds that by raising the rate of second class matter, letter postage could be reduced to one cent and the P. O. Department could be made to pay for itself. We will, undoubtedly have a parcels post eventually but at present there are a great many things to be considered, such as the rate, the relations with Express Companies, and prevention of abuse of the system by the large companies delivering goods, etc. *The Saturday Evening Post* for January 12, has a very good article concerning the systems in use and their success in Europe, which is worth reading.

* * *

L. H. Bailey in the January *Century* praises the work of Mr. Charles E. Patten of Charles City, Iowa, for his methodical system of plant-breeding. Mr. Patten began his plant-breeding work over forty years ago, before any public institution had undertaken any investigation of this kind. Being a nurseryman, he endeavored to produce fruit trees hardy enough to withstand the cold prairie conditions. This resulted in the production of the Patten Greening, now a standard apple of the Iowa-Wisconsin-Minnesota region, and several other accepted varieties. Besides, Mr. Patten has a large number of new and promising things awaiting further test. At present, he has more than 10,000 apple seedlings of known parentage growing on his plantations. The results of his tests will be watched for with interest by plant-breeders everywhere.

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THE STALLIONS ON EXHIBITION DURING FARMERS' WEEK.

From left to right: Hackney Pony Stallion, owned by F. S. Peer, Ithaca. Hackney Stallion, owned by College of Agriculture. Percheron Stallion, owned by College of Agriculture. Percheron Stallion, owned by F. S. Peer, Ithaca. German Coach Stallion, owned by C. E. Seaman, Ithaca. Percheron Stallion, owned by Darwin Rumsey, Ithaca.